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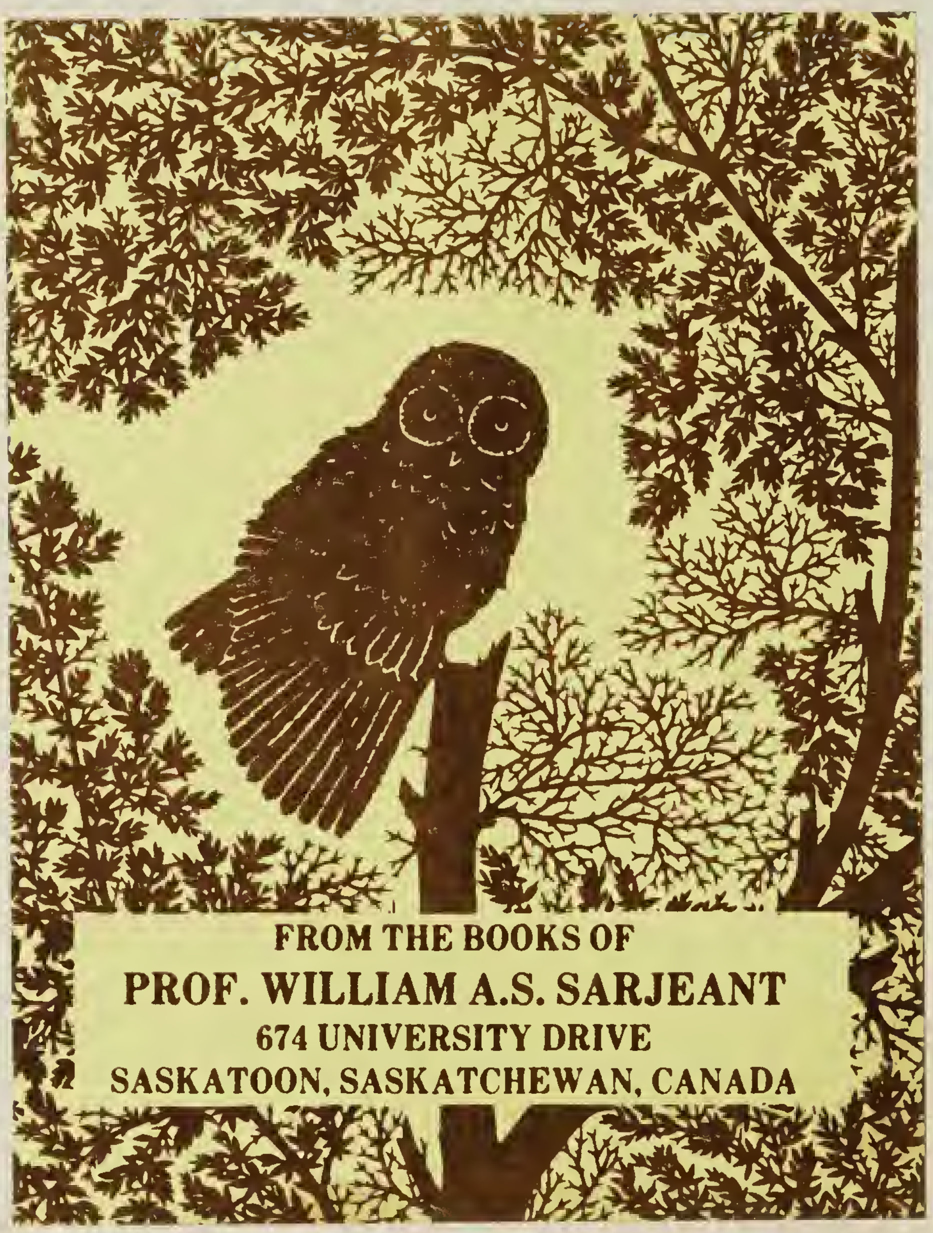

FROM THE BOOKS OF
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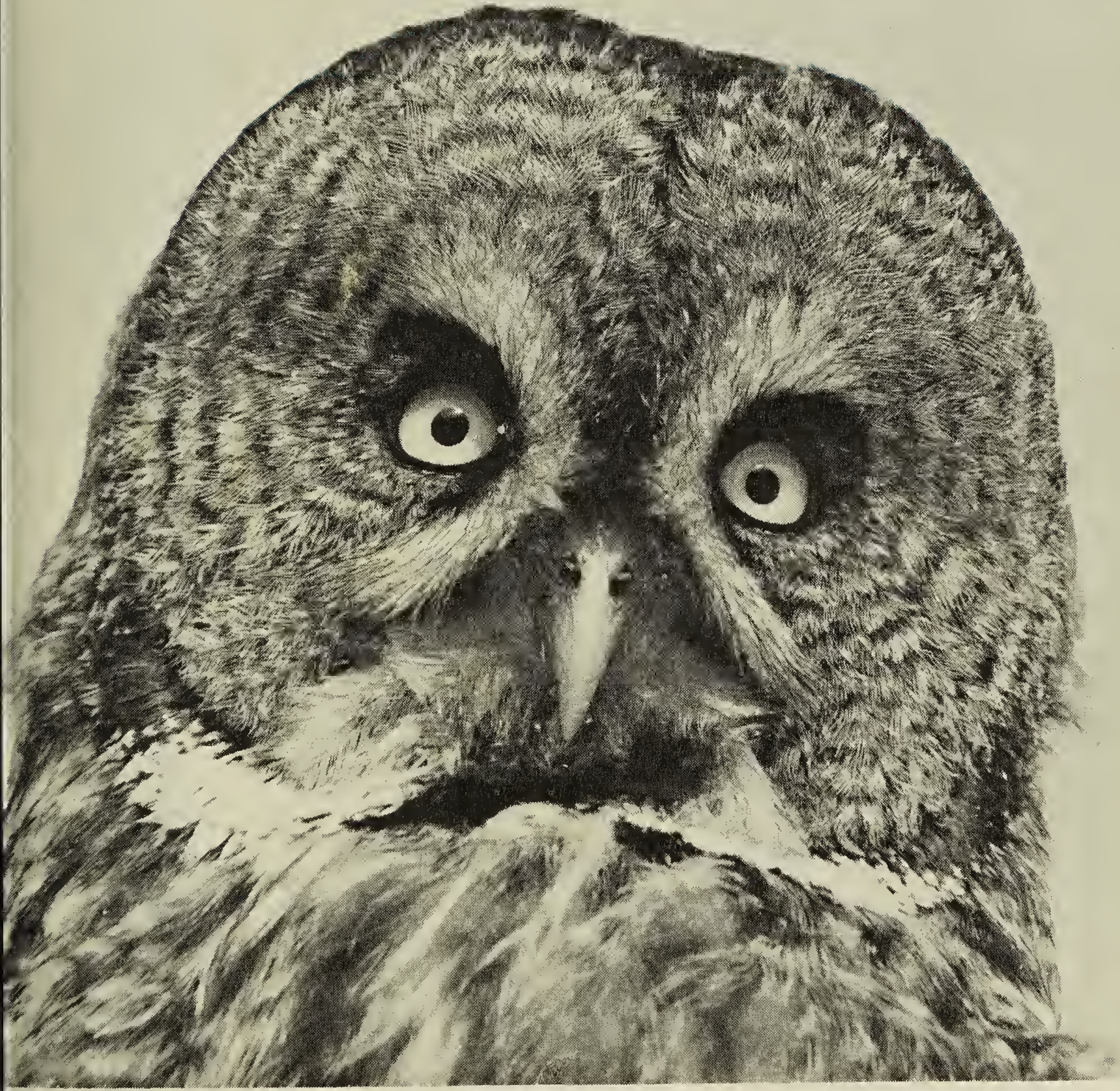
BLUE JAY

A JOURNAL OF NATURAL HISTORY AND CONSERVATION
FOR SASKATCHEWAN AND ADJACENT REGIONS

ol. XXVII, No. 1 Regina, Saskatchewan March, 1969



reat Gray Owl, Prawda, Manitoba, January 13, 1969 Photo by Robert R. Taylor, Manitoba Museum of Man and Nature

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Regina, Saskatchewan

EDITORIAL

Recently, I was part of an SNHS delegation that met the Honourable Mr. Douglas, MP for Assiniboia, to discuss with him the Society's views on the establishing of a grasslands park. We wanted Mr. Douglas, whose constituency includes part of the land originally proposed by our Society for this park, to know how concerned we were last fall to learn that plans for a national prairie park had been given up for the current budget year.

You will remember that our Annual Meeting in Yorkton last October strongly protested this announcement. We sent resolutions urging both the federal and provincial governments to reconsider the decision, and to study forms of park management that would make the establishment of a prairie park practical.

As you know, SNHS has repeatedly urged the creating of a grasslands park in the southwest of the province, and officials of both the Saskatchewan and Canada governments have declared their approval of a national prairie park. This would be perfectly in keeping with the stated basic purpose of national parks (May 31, 1962), namely "to preserve for all time areas of national significance for their geographical, biological or geological features, as a national heritage for the benefit, education and enjoyment of the people of Canada, present and future."

We know that very serious study was given to the unique grasslands area along our southern border by a team of federal government biologists. This area contains birds like the Sage Grouse, Sage Thrasher and Brewer's Sparrow, reptiles like the Horned Lizard, mammals like the Prairie Dog and the Pronghorn Antelope, and plants like *Astragalus purshii* and *Antennaria dimorpha* which occur almost nowhere else in Canada. At the same time the area studied is large enough to give the impression of never-ending prairie expanse and to reduce the effect of outside influences on the original wildlife species.

In spite of these encouraging studies, plans for the park have not gone ahead. In fact, the joint negotiations that must take place between the two governments seem to have broken down, and although various reasons have been given for this by government spokesmen, it is apparent that the matter of financing the project is an important obstacle. The land for a national park must be turned over to the federal government free of all encumbrances, and a number of difficulties seem to stand in the way of the provincial government's providing these large tracts of land.

Our Society has been suggesting that a more flexible attitude might be taken to the means and timing of land acquisition. We know that there are people now living in the area, and others with grazing leases there. We think it should not be necessary to cancel or buy up these immediately, and that it might be possible for the present lessee to retain the land as long as he is interested in ranching. With controlled grazing, this land would meanwhile be protected against the invasion of agriculture with accompanying rising land prices and destruction of native plants and animals.

The delegation that discussed the park with Mr. Douglas included J. Wedgwood of Saskatoon, H. C. Moulding of Ducks Unlimited, Regina, Norm Flaten, who has a farm at Weyburn, and myself. We represented a wide range of interests in the society, all equally concerned with preserving our grasslands. A similar delegation had previously had a worthwhile discussion with the MP for Saskatoon, the former Dean Otto Lang, now a minister without portfolio in the federal cabinet. We want to get as wide a hearing as possible with interested government people. Can you talk or write to your local MP's and MLA's?—George F. Ledingham.

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THE NEED FOR CITIZEN INVOLVEMENT IN CONSERVATION ORGANIZATIONS: THE EXAMPLE OF THE NATIONAL PARKS

by **J. G. Nelson,** The University of Calgary, Calgary

Canadian citizens need to be more concerned about rapid and large-scale changes in landscape and land use. One way of illustrating the scale and gravity of such problems is simply to cite examples from various parts of Canada. In the Maritimes one need only look at the St. John River, a stream so polluted as to be of little value for fishing or recreation for many tens of miles of its length. In Quebec the city of Montreal illustrates rapid, uneven urban growth very consumptive of rural land, quiet countryside and certain kinds of wildlife. In Ontario we find a variety of problems, for example, the pollution of Lake Erie, difficulties in preserving wildland in Algonquin Provincial Park and the gradual infilling and pollution of Hamilton Bay. Closer to home are the pollution of the South and North Saskatchewan Rivers and impending massive strip-mining in the Crows Nest Pass area, British Columbia without adequate statutory safeguards for rehabilitation of landscape following completion of operations.

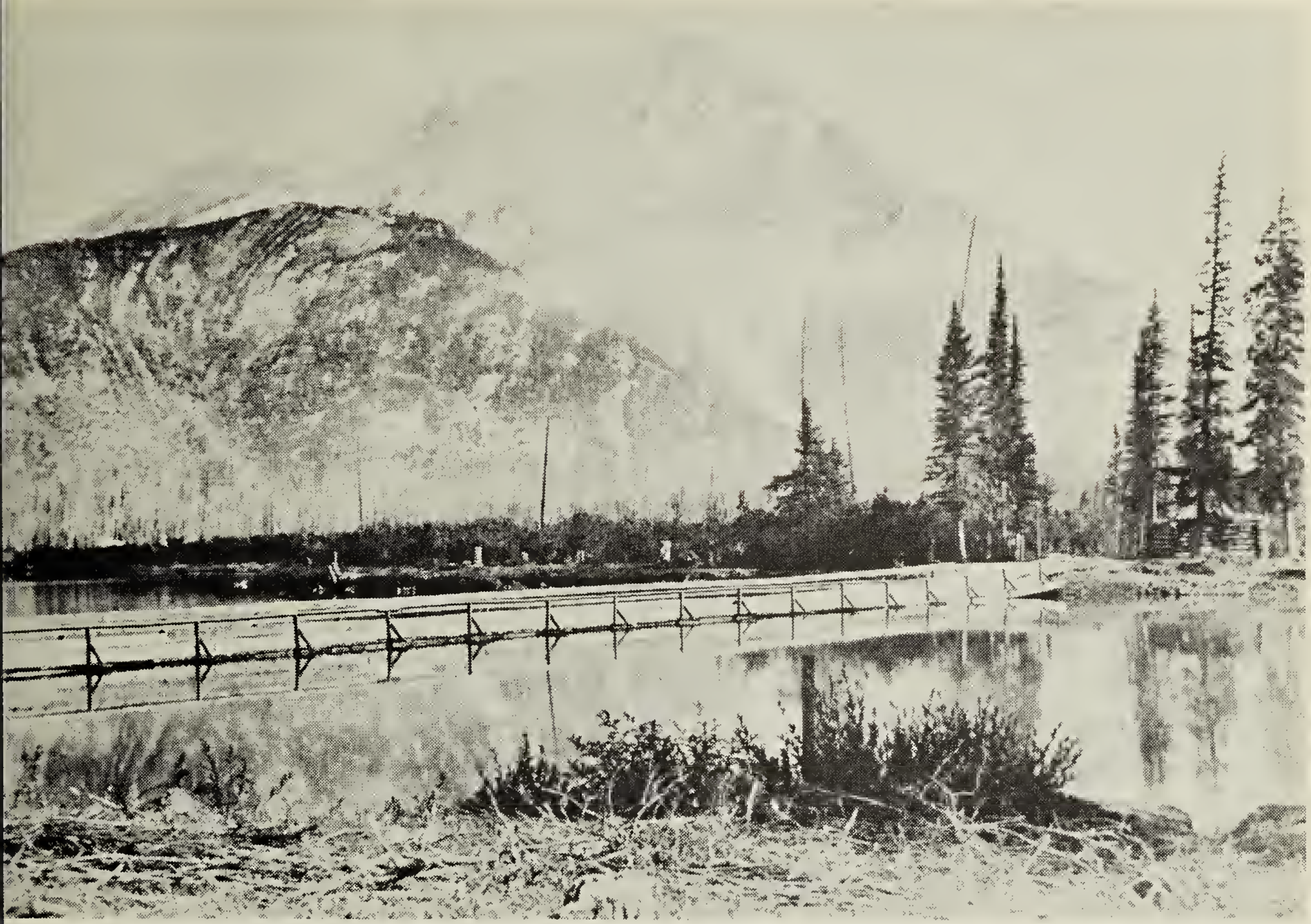
Land use and landscape change problems in Banff and other national parks are of special interest to me. The Banff reserve was established in the mid-1880's, after many years of trapping and prospecting and a few years of lumbering, mining, railroad construction and white settlement had seriously reduced wildlife and caused profound changes in vegetation. Numerous forest fires were started deliberately or through carelessness, destroying extensive stands of spruce and fir, the so-called climax forest.

The hand of man remained heavy for the first few decades following the establishment of the park. Fires continued to be frequent, many being caused by sparks thrown from the early wood and coal burning railway engines. Hunting and poaching were commonplace into the early 1900's. Only at that time were game and fire wardens taken on staff and a policy of landscape protection introduced.

Since about 1910 two policies have been followed by the federal government. One has been protectionism. Fire control has been stringent, allowing extensive stands of fire-following lodgepole pine to replace burned-over spruce-fir forests. Many forms of wildlife have been protected and elk and other animals have become quite numerous. Protectionism also has worked to eliminate lumbering, mining and other activities which formerly caused serious landscape change. The vagaries of the market sometimes seem, however, to have been as important as new national park regulations in removing some of these activities from Banff National Park.

At the same time that this protectionist policy was being pursued, the federal government also developed a recreational policy which led to the introduction of many facilities in Banff Park. The townsite of Banff was established as a spa, originally conceptually distinct from, but eventually geographically and operationally part of, the national park. Banff townsite grew into a good-sized resort by the 1930's. Scenic and transit highways were also constructed through the park, beginning about the time of the first World War, with large areas being opened up through construction of routes such as the Banff-Windermere and the Banff-Jasper highways in the 1920's and 1930's.

After World War II, growing population, rising income, more leisure time and other factors contributed to a rapidly accelerating demand for recreation. To meet this demand, the National and Historic Parks Branch



Geological Survey of Canada Photo, 1886

Cascade Mountain and Bow River, Banff in 1886. Note effects of forest fire and umbering. Pontoon bridge was used in construction of original Banff Springs Hotel.

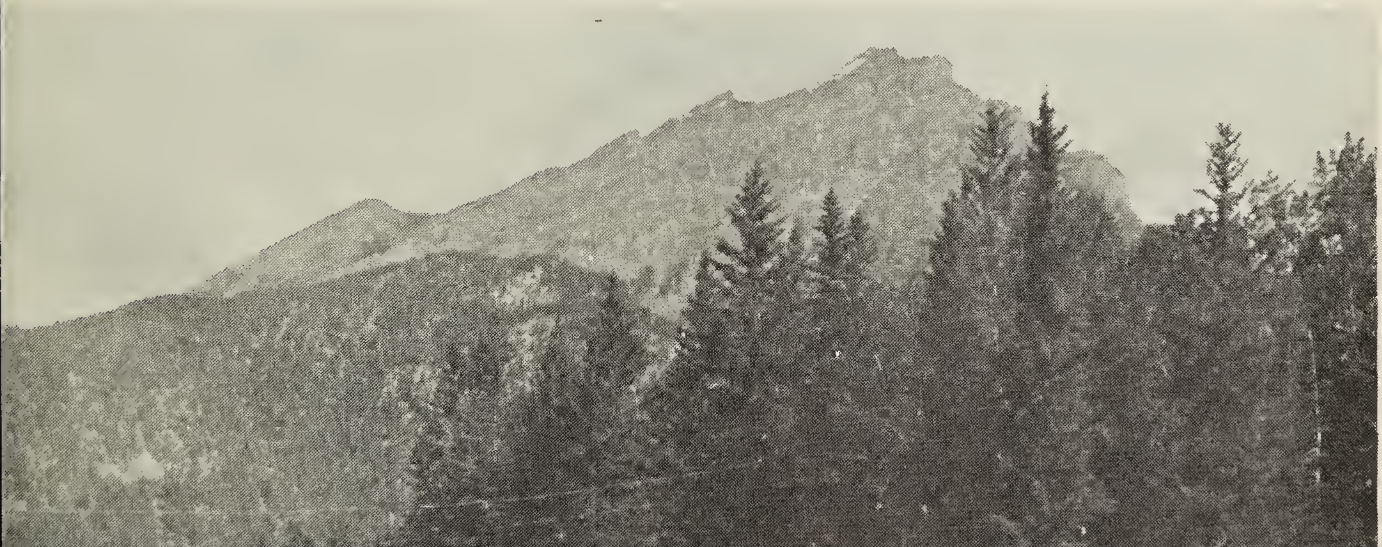


Photo by R. C. Scace, 1965

Cascade Mountain and Bow River, Banff in 1965 showing results of protection n the National Park.

has introduced or proposes to introduce a variety of new recreational facilities, including expanded or new service centres, downhill ski runs and associated parking lots and restaurants, and scenic roads, campsites, gas stations and other units for tourists and automobiles.

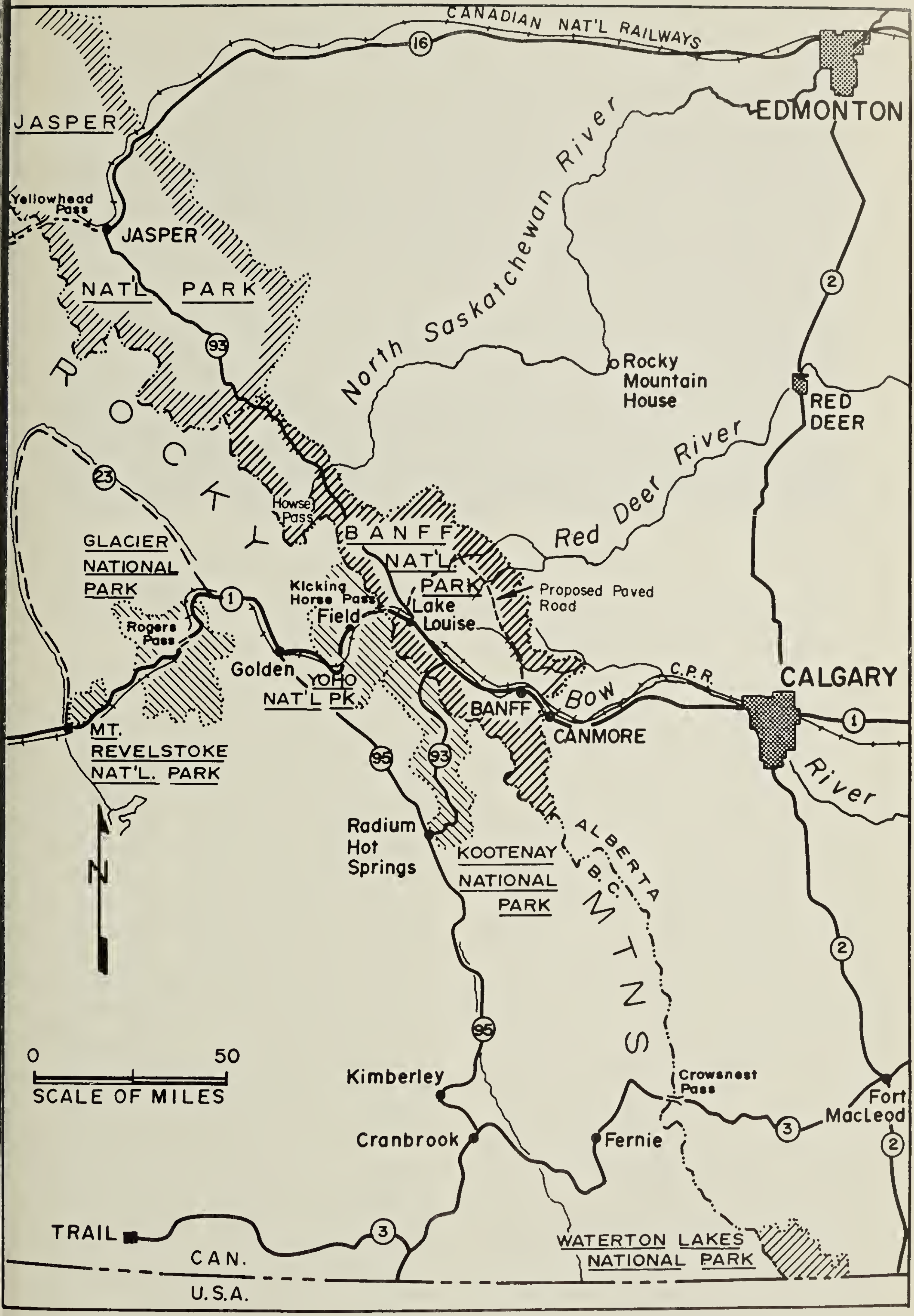
The introduction of these facilities will cause large-scale changes in Banff National Park. Some of the changes will occur because certain of the proposed developments are large in their own right. A good example is the scenic road programme which will open up many "wilderness" areas to the tourist. The roads will be constructed for the most part in the valleys and will tend to divide the present "wilderness" into a number of smaller units generally mountainous or highland in character. Other proposed changes seem small in themselves but can cumulate and cause considerable change.

In the light of this, many authorities feel that the emphasis in the national parks should be on non-facilities recreation, that is on hiking, "wilderness" camping of several days duration, cross-country skiing and other activities which require a minimum of facilities and cause relatively little landscape change. They feel that the demand for such activities is increasing so rapidly in Canada and elsewhere that areas considerably greater than our present national parks will be needed to provide for the desired experience in future. Other areas, such as the Alberta provincial forests, could be developed for the ever greater number of people who require more downhill ski runs, ski-doo trails and other facilities-oriented recreation.

Certain of the proposed changes in Banff Park seem to be based on inadequate study of relevant biological, geological, geographical and historical criteria. An example is the proposed Red Deer road which would run for about 45 miles up the Cascade fire road, north of Lake Minnewanka, then be cut west through about 40 miles of the roadless upper Red Deer valley to link with the Trans-Canada highway near Lake Louise. Construction through the upper Red Deer would be particularly unfortunate as this probably is the largest of those areas in the park where the landscape is still comparatively close to what it was at the time that the fur trader and the Indian roamed the land. The upper Red Deer largely escaped the fires, mining and lumbering that affected so many other parts of the parks in the decades around the turn of the twentieth century. It is therefore covered for the most part with relatively old spruce-fir forest rather than the fire-following lodgepole pine. The upper Red Deer also shelters grizzly bear, mountain goats and other animals not so commonly seen in parts of the park more frequently visited by the automobile and large numbers of people. Its importance as a habitat for these animals certainly merits further study before any road is constructed through the valley: although, to my mind, there is already a considerable body of evidence in support of the idea that this valley should not be open to the automobile as so many other areas have been and will be. Rather it should be preserved for the hiker, the camper, the photo hunter and others who wish to enjoy the so-called "wilderness experience" as well as to spend a few days walking through a valley with a landscape rather like that seen by the first Europeans to come to the Rockies many decades ago.

Citizens can help prevent undesirable landscape change in a number of ways. First, they can inform one another of problems, particularly through journals like the *Blue Jay.* Second, they can write to responsible people in government or the civil service and express their views. Third, they can demand public hearings on land use plans and ensure themselves that all alternative courses of action have been considered and a sound decision made.

Finally, they should join at least some of the various citizens' organizations that are forming to deal with the increasingly numerous land use


CANADIAN NAT'L RAILWAYS
16
EDMONTON
JASPER
Yellowhead Pass
JASPER
NAT'L PARK
North Saskatchewan River
2
93
ROCKY MTNS
Rocky Mountain House
RED DEER
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23
Howse Pass
BANFF NAT'L PARK
GLACIER NATIONAL PARK
Kicking Horse Pass
Field
Lake Louise
Proposed Paved Road
1
Rogers Pass
Golden
YOHO NAT'L PK.
C.P.R.
CALGARY
Bow
BANFF
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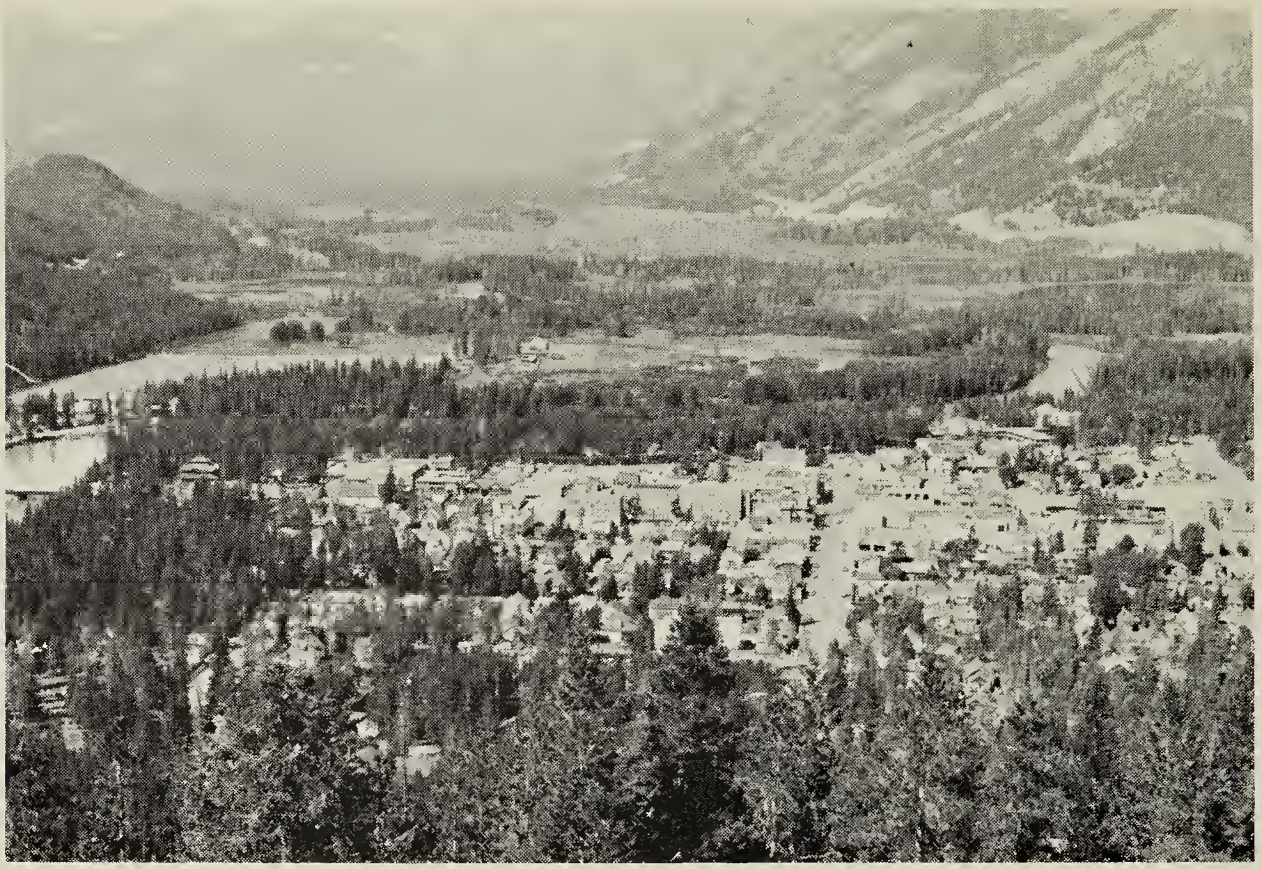


Photo by R. C. Scace, 1965

Aerial oblique of Banff townsite, 1965, showing extensive tree cover especially along the banks of the Bow River. Note the distinct landscape modification caused by the construction of the Trans-Canada Highway during the 1950's.

and landscape change problems in Canada. Granted there are a number of these organizations, but many of them are important avenues to information and to co-operative work on problems of mutual interest. One such organization, of particular interest to me, is the National and Provincial Parks Association of Canada (43, Victoria Street, Toronto 1, Ontario, membership fee of $5.00 per year, "Park News" issued quarterly). This organization is directly concerned with the proper management and development of national and provincial parks. As a consequence, it is also indirectly concerned with strip-mining, lumbering and other activities which can affect present and potential parkland. For years administrators and citizens called for such an organization; for example, in the proceedings of the *Resources for Tomorrow Conference*, held in Montreal in 1961, it was also recognized that: "There is a need for an informed . . . non-government organization to promote the interest of park development and perform a watchdog role over those areas now reserved for parks purposes." Yet, since its formation a few years ago, the Association has not attracted the citizen response it deserves. Without adequate citizen and corporate support it cannot achieve the financial base necessary to improve its journal and its awareness and coverage of parks problems. Nor is it sufficiently often in a position to send representatives to relevant meetings or to talk to responsible or influential corporate or government personnel. Citizens must surely be more concerned about the present and future importance of organizations such as the National and Provincial Parks Association of Canada. As the scale and frequency of land use and landscape problems increases, it is more and more desirable that we contribute our funds, energies and interest to such organizations if we are to work together effectively to provide better parks and landscape for ourselves and our children.

A PALAEONTOLOGICAL HOLIDAY

A visit to the Hunter Quarry near Eastend

by **Mrs. Hope Johnson,** Ralston, Alberta

Late last May I decided to take advantage of an invitation from Dr. A. G. Edmund of the Royal Ontario Museum to join their party which had begun its 1968 operations at Calf Creek some three weeks earlier. I live some 25 miles northwest of Medicine Hat, and decided to go to the Hanson Ranch via Piapot and southeast. I discovered that while this route is shorter, it is by no means the simplest way to go. Anyone familiar with back roads in this part of the country will know what I mean. It had rained recently, and the narrow roads were rough and rutted. A couple of farmers looked at me doubtfully and said they had never heard of Clintonel. However, I had a detailed map, and kept on until a cheery lady at a tiny cottage near Skull Lake assured me it was close by. Within short order I found myself on a newly graded road running down toward Eastend. (Clintonel was there too, tucked away in a wooded hollow.) Dr. Edmund had provided me with detailed directions to the quarry, and after calling at the ranch, and wrestling with a particularly decayed wire gate, I climbed the steep ridge behind the farm yard, and then descended quite suddenly (in fact, the trail appeared to vanish over a minor precipice at one point!) into the coulee where Calf Creek rises out of the ground amid large quartzite pebbles, and about a mile on, disappears mysteriously underground among the mossy roots of a tangle of shady trees.

I arrived in the early afternoon of a fairly hot day, and the first thing that I noticed about the coulee was the strong and agreeable scent of Silverberry (or "Wolf Willow"—*Eleagnus commutata*). There were two large stands of this shrub in the coulee, and they were in full bloom. Surely this powerfully scented flower has some commercial possibilities. How about a new Saskatchewan soap?

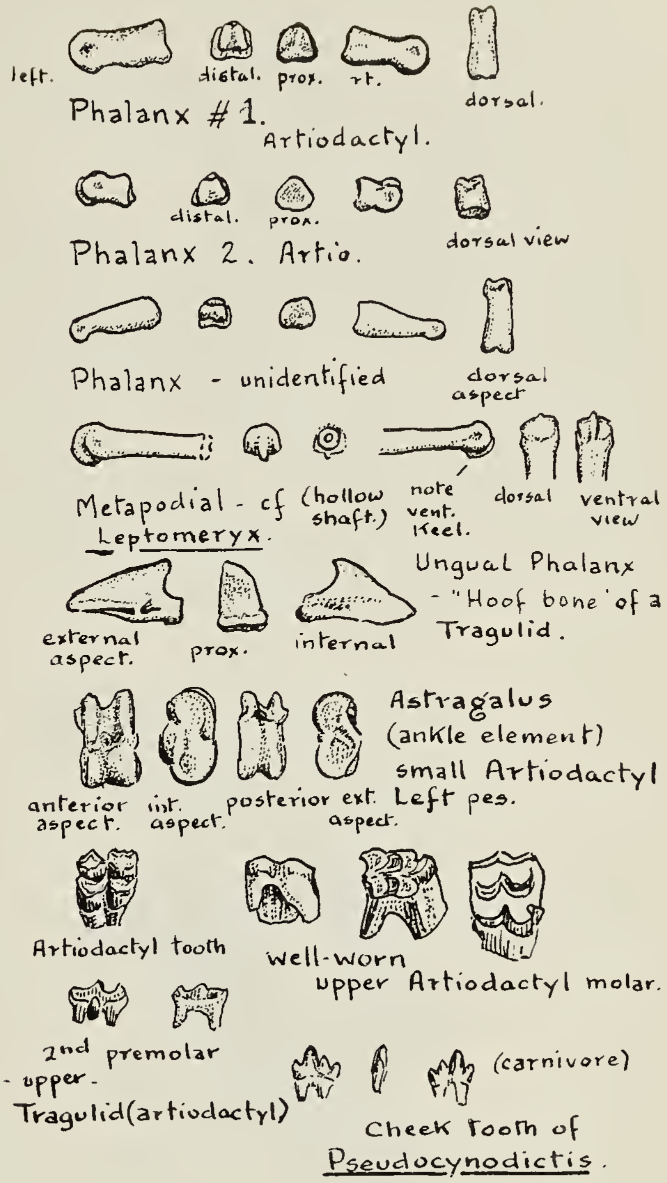
The main part of the R.O.M. party was up on a hillside on the east side of the valley, where, under a 30-foot cliff of cross-bedded sand, students and two technicians were working under Dr. Edmund's direction. At this point in the Cypress Hills, the upper levels are in the Cypress Hills formation, composed here of alternating sands, silts and lenses of hard conglomerate. The conglomerate has a very hard limy matrix in which are embedded hard quartzite pebbles and clayey concretions. Small fossils are found in the sands and silts, while the large items are mainly found in the hard conglomerate rock. It is believed that there was a lake in this area in early Oligocene time, some 45 million years ago. The animals of this period were mainly rather primitive forms of mammals known to us today — very early horses, large and small relatives of the rhinoceros—kin to the horses — called Brontotheres (Titanotheres); huge primitive "pigs" called Entelodonts with skulls up to 18 inches long; Oreodonts, grazers of sheep size long since extinct without leaving descendants; small carnivores rather like a raccoon; tiny primitive deer similar to the Chinese Water Deer and Dikdik of Southeast Asia today; crocodiles, turtles and fish, especially large catfish. The remains of the large animals seem to be found mainly on the upper surface of the conglomerate lenses, from which they have to be removed with gasoline-powered jackhammers and rock saws. The pit was a rather nasty place on windy days, since the cross-bedded sands above it were not consolidated, and constantly sifted down upon the operators of the power tools, and the searchers for new specimens. In fact, a few days after I left the area,

Hunter Quarry from west side of Calf Creek

heavy equipment was brought in, hired from the road contractors, to cut further back into the hillside. Evidently the sand was even looser in the new cut, because it soon collapsed into the pit, completely frustrating the "dig".

While hunting and digging and rock-cutting went on in the main quarry, two or three of the students (in all there were ten boys and two girls, all seniors at Toronto High Schools) would go off and prospect on the adjoining hillsides for small fossils, or any likely-looking outcrops with larger material. Some mechanical screening of sandy deposits had been done across the valley, but this particular deposit had pretty well been worked out.

Since looking for small fossils is more in my line, I went off with a couple of boys over the hill to the southwest. The conglomerate of these hillsides was much weathered, and often overgrown with Bearberry and various tufted grasses. The hills in this area are very arid, but there seems to be a spring-fed creek in every coulee, rising just above the Ravenscrag formation which is of Paleocene age (maybe 60-55 million years old). Sandy spots abounded in tufts of Bladder-pod *(Lesquerella alpina)*, while there were small stands of Low Larkspur in moister places. The best hunting spots were the most denuded hillsides, and there one could find, by getting one's nose quite close to the ground, the teeth and tiny bones of the small deer previously referred to. The teeth are like those of today's deer, but very small, from one-quarter to three-eighths of an inch across. The little bones of the fore and hind feet, with the tiny hoof bones (the horny hoof itself is not preserved as a fossil) are comparable in size to the foot bones of an average-sized rabbit, though unmistakably deer, not anything else. I was especially pleased to find a three-quarter-inch long astragalus (an ankle element) of such an animal, which is identical in shape to that of a modern bison, or cow or deer. Most of these fossils are a light rusty tan colour, and well mineralized. I also found a cheek tooth (molar or premolar) of a small carnivore, rejoicing in the name of *Pseudocynodictis*, which was apparently an ancestor of our dogs and wolves. There were lizard vertebrae, fragments of crocodile skull, turtle bones and plates, a gar pike scale like those found in the dinosaur beds nearer home, and vertebrae and spines from large catfish. Judging from the size of these, and the very formidable looking saws on the edges of the dorsal spines, these catfish must have been able to give an adversary plenty of trouble. We found many fragments of very large Brontothere teeth, but good intact specimens were another matter. Unlike their relatives, the horses of today, these animals were browsers with low-crowned molars, and curious peg-like incisors. One student found a beautiful specimen of one of these, exactly like a wooden cribbage peg, about one and a quarter inches long, with a knob-like enameled crown. These were used, Dr. Edmund said, to rip the leaves off branches. There is a good deal of fossil wood in the Cypress Hills formation here, and so far as has been determined to date, much of it is of broad-leaved trees such as oak and elm. The theory is that the gradual change from such woodlands to the later grasslands spelled the end of the browsing Brontotheres, whose not very durable dentition could not make the transition to a grass diet. It fact, we quite often found teeth in which almost the entire enamel crown was worn away. This must have left the animal in an awkward condition. Early horses had low crowned teeth, but strains which developed high crowned teeth were able to survive, so the horse is with us still. I found some ankle elements of Brontothere, the astragalus recognizable by its resemblance to that of a modern horse, rather than the type seen in the cattle, sheep, deer group *(Artiodactyla.)*



Fossils from Cypress Hills Oligocene, about 2/3 natural size.

While we were collecting on one hillside, we could see, on an adjoining hill, a little cave, to which an owl was making flights. With binoculars, we could see an owl, presumably a young one, sitting within the cave. After lunch I decided to visit friend owl in his stronghold, which was some 20 feet below where we had decided to eat our lunch. Upon seeing me, the owl which was fully feathered, put up a wonderful, and I suppose it hoped, frightening performance. It stood up, leaned forward, and fluffed itself out as much as possible, drooping and spreading its wings. It then snapped open and shut its eyes, first together, then alternately, and loudly clacked its beak. I wanted to giggle, but felt that this would spoil the dignity of its act. I withdrew, seeming to be properly impressed—I was too, in a way—and told the boys to go down and call on it, which they did. They were as delighted as I with its behaviour and we were all sorry that we had no movie camera. I believe it was a Short-eared Owl.

There were many wildflowers growing along the creek below—especially the mauve fleabane, *Erigeron philadelphicus.* There was a colourful showing of a nice blue Speedwell, probably *Veronica americana.* There was a good growth of trees in this area, mostly Balsam Poplar, White Spruce and Beaked Willow. The Silverberry, Shrubby Cinquefoil and Gooseberry were common, and some Canada Buffaloberry.

Hope Johnson.

Low Larkspur

Back along Calf Creek there were tall buttercups growing in the stream margins, and tucked under gooseberry bushes I saw plants of the Mealy Primrose *(Primula incana).* In moist places there was plenty of Silverweed with its buttercup-like flowers, and strawberry-like runners. There were Buffalo Beans, four Penstemons, Ascending Milk Vetch, Late Yellow Loco Weed, Western Wild Bergamot, Wild Gaillardia, Lewis' Flax, Silvery Groundsel, Cut-leaved Anemone, Crocus Anemone, Wild Strawberry, Pale Comandra, Clustered Oreocarya, Silvery Lupine, Three-flowered Avens and Shining Arnica. A sort of film of the small white flowers of what I took to be Rocky-ground Sandwort covered all the surface of the more open ground. The spring had been very late, so it appeared that the spring and summer flowers were in bloom together.

As for fauna, there were Mule Deer, cattle (which we were obliged to drive off periodically), Richardson's Ground Squirrel and birds. Mostly I noticed Robins and surprisingly, to me, the Oregon Junco, which I had not seen since living out at the West Coast, some twenty-five years ago. The "gophers" were a pest, since they evidently regarded the commissary arrangements of the expedition especially laid on for their benefit. It was difficult to find enough metal containers to keep them even partly frustrated. There must have been general mourning among them when the R.O.M. party took off to Milk River!

The collecting work was interrupted rather too frequently during my four-day stay by squally showers with very gusty winds. The camp was under canvas, and there were times when rain would make things a bit miserable. To my surprise, the boss, Dr. Edmund, was chief cook. I earned my keep, at least in part, by peeling potatoes and scrubbing some of the pots, etc. The impact of the Cypress

Hills countryside on the Toronto students was most satisfactory. One lad, on a chilly damp morning, when I suggested that it was *not* a very good morning, insisted that "Down here, it is always a good morning!" A few had periodic longings for bright lights (not very handy to Eastend). One evening a bunch of us crammed ourselves into a tent and for hours sang Gordon Lightfoot songs. One of the boys had a "double-decker bed" of a new kind—his regular cot above, and a collection of bones and stones below —"my bone-bed" as he said!

I was interested to find that one of the two Museum technicians had formerly been an operating room technicians working with doctors on broken human bones, while the other was a former resident of Liverpool, England, with a Beatle-like accent, and years of experience as a plasterer in the building trade. Not long after coming to Toronto, he had been hired to work at the Museum under a display-planner, to build an artificial mineral cave. When his boss gave up on the job, Jerry, finding his new occupation much more to his liking than work on houses, stayed on, putting his skills in plastering and construction to work with fossils and minerals. It was his first season in the field, and he told me he never wanted to go back to his former occupation, as the new one seemed to offer so many new and exciting possibilities.

After a four-day stay, the weather threatened to turn very wet, and I decided to get out while the going was good. I took the new road down to Eastend, west to Govenlock, north past the Cypress Hills Park, up to Maple Creek and out to the Trans-Canada Highway. Near the Alberta border I encountered pouring rain, so I was rather glad I had got out of the hills. Later in the summer I went collecting several times in the Oldman Formation (late Upper Cretaceous—dinosaurs, etc.) along the Red Deer River with Dr. Dale Russell of the National Museum of Canada, and also along the South Saskatchewan River, collecting fossil wood with Dr. Wilson Stewart, a palaeobotanist, who is now head of the Botany Department at the University of Alberta. However, my trip to the Saskatchewan end of the Cypress Hills has left me with a yen to go back to Calf Creek.

Drawings by Hope Johnson

White Penstemon

TWENTY-SEVENTH ANNUAL SASKATCHEWAN CHRISTMAS BIRD COUNT, 1968

Compiled by **Mary Houston,** 863 University Drive, Saskatoon

In spite of very bitter weather during the 1968 Christmas Count period enthusiastic bird counters throughout the province turned out in force. Thirty-eight counts were sent in from Saskatchewan localities, surpassing 1960's high of 34. In addition one count was received from Alberta and one from the Northwest Territories. Fifty-two counters turned out in Saskatoon to compile the largest number of species, 36, ever counted in their area on a Christmas count.

As usual Black-billed Magpies (in 36 localities) and House Sparrows (in 33) were the most frequently recorded species. Bohemian Waxwings were widespread — being counted in 28 areas. They were followed closely by Black-capped Chickadees (28), Common Redpolls (28) and Snow Buntings (26).

One new species was added to the all-time total — a Red-necked Grebe, reported from Regina. In additional species seen, another first is provided for the provincial list of Christmas count species by the Oldsquaw taken in the Fort Qu'Appelle area on December 21, 1968. The duck was a female, in between summer and winter plumage, taken at Sioux Bridge at the east end of Pasqua Lake on an open stretch of water. Jack Lowe and his son Jay were later able to acquire the specimen for E. Manley Callin, who is preparing a check-list of the birds of the Qu'Appelle Valley. According to Mr. Callin, this is the first record for the Qu'Appelle Valley area since 1907. This brings the all-time total to 112 species seen on count days plus seven additionals seen during count period.

BANGOR, Jan. 2; 30 miles by car; temp. –25°; 9 species, 145 individuals. Great Horned Owl, 1; Downy Woodpecker, 1; Black-billed Magpie, 2; Black-capped Chickadee, 5; Bohemian Waxwing, 4; House Sparrow, 6; Pine Grosbeak, 16; Common Redpoll, 20; Snow Bunting, 90.—Mrs. A. Thompson.

BATTLEFORD, Dec. 31; 26 miles by car and 3 miles on foot; temp. –15°; sunny and clear; 12 inches of snow; 9 species, 575 individuals. Ruffed Grouse, 2; Rock Dove, 21; Boreal Owl, 1; Horned Lark, 4; Black-billed Magpie, 1; Black-capped Chickadee, 2; Northern Shrike, 1; House Sparrow, 43; Common Redpoll, 500.—Spencer G. Sealy.

BORDEN BRIDGE, Jan. 1; 22 miles in 1½ hours by car and 3 miles in 2 hours on foot; temp. –12°; wind west at 6 m.p.h.; clear; about 6 inches of snow; 7 species, 106 individuals. Rough-legged Hawk, 1; Snowy Owl, 1; Downy Woodpecker, 2; Black-billed Magpie, 7; Black-capped Chickadee, 9; House Sparrow, 2; Common Redpoll, 84.—Jon, Peter and Chris Gerrard, Victor Ince, John Waddington, Doug Whitfield.

BROADVIEW, Dec. 26; 65 miles by car and 2 miles on foot in 8 hours; temp. 1°; wind S.E. 10 mph; 9 species, 200 individuals. Mallard 3; Rock Dove, 5; Black-billed Magpie, 54; Black-capped Chickadee, 14; Bohemian Waxwing, 28; Starling, 8; House Sparrow, 53; Lapland Longspur, 25; Snow Bunting, 10.—D. G. Francis.

CHRISTOPHER LAKE, Dec. 30; about the yard all day; 5 species, 46 individuals. Blue Jay, 7; Raven, 6; Black-capped Chickadee, 12; White-breasted Nuthatch, 1; Evening Grosbeak, 20±. (Add: Gray Jay, 2-6, Dec. 24, 25, 29, 31, Jan. 1).—Gordon Robertson.

CRAVEN, Dec. 21: 58 miles by car and 3½ miles on foot in 5½ hours; temp. –10° to –2°; no wind; clear; 2 inches of snow; 12 species, 541 individuals. Rock Dove, 3; Great Horned Owl, 3; Hairy Woodpecker, 2; Black-billed Magpie, 32; Black-capped Chickadee, 2; Bohemian Waxwing, 87; Northern Shrike, 2; Starling, 1;

House Sparrow, 139; Rusty Blackbird, 1; Pine Grosbeak, 1; Common Redpoll, 268. — Gregg Bobbitt, Eric Cooke.

DILKE, Jan. 1; 49 miles by car and 3 on foot in 3 hours; temp. 0° to –10°; cloudy; wind variable 5 mph to N 15 mph; snow 8″ drifted; 11 species, 343 individuals. Gray Partridge, 11; Rock Dove, 6; Short-eared Owl, 2; Horned Lark, 200; Black-billed Magpie, 14; Black-capped Chickadee, 1; Bohemian Waxwing, 26; House Sparrow, 50; Rusty Blackbird, 3; Common Redpoll, 29; Lapland Longspur, 1. (Add: Northern Shrike, Dec. 21, 23; Snow Bunting, Dec. 22, 25, 26, 27, 31.) — Boswell Belcher (compiler), Margaret Belcher, Margaret Houston.

ERINFERRY, Dec. 21; 10 species, 54 individuals. Hairy Woodpecker, 2; Gray Jay, 2; Blue Jay, 6; Black-billed Magpie, 3; Raven, 3; Black-capped Chickadee, 4; House Sparrow, 6; Evening Grosbeak, 6; Pine Grosbeak, 2; Snow Bunting 20±. (Add: Sharp-tailed Grouse, 9, Dec. 23; Common Redpoll, 4, Dec. 23).—Mrs. E. A. Dodd.

FORT QU'APPELLE, Dec. 23; temp. –2°; mostly overcast, snowing lightly; 3 inches snow on fields; 16 observers; 16 species, 176 individuals. Mallard, 4; Common Goldeneye, 2; Common Merganser, 1; Hairy Woodpecker, 1; Downy Woodpecker, 2; Blue Jay, 2; Black-billed Magpie, 15; Black-capped Chickadee, 12; Bohemian Waxwing, 50; Northern Shrike, 1; House Sparrow, 19; Rusty Blackbird, 1; Pine Grosbeak, 3; Common Redpoll, 2; Harris' Sparrow, 1; Snow Bunting, 60. (Add: Oldsquaw, 1, Dec. 21; Goshawk, 1, Dec. 28; Ruffed Grouse, 2 on Dec. 22 and 26; Gray Partridge, 26 on Dec. 27; Rock Dove, 12 on Dec. 22; Horned Lark, 16 on Jan. 1; Robin, 2 on Dec. 30).—Dr. and Mrs. G. D. Barnett, E. Manley Callin (compiler), Mr. and Mrs. Errol Cochrane, Mr. and Mrs. Bernie De Vries, Mr. and Mrs. William Gray, Miss Johanna Kelly, Jack and Jay Lowe, Dick Nevard, Horace Reed, Sham Regan, Joe Rumancik.

GRENFELL, Dec. 22; on foot 1½ miles plus 2 miles about the yard, and 6 miles by car; temp. 10°; wind NW at 10 mph; 4-6″ of snow; 8 species, 131 individuals. Sharp-tailed Grouse, 6; Rock Dove, 4; Horned Lark, 5; Black-billed Magpie, 4; Starling, 4; House Sparrow, 100; Common Redpoll, 6; Snow Bunting, 2. (Add: Gray Jay, 1, Dec. 24).—Mr. and Mrs. John Hubbard.

INDIAN HEAD, Dec. 30; about the yard and within 1½ miles of the house; temp. –18°; clear; calm; 13 species, 485 individuals. Yellow-shafted Flicker, 1; Hairy Woodpecker, 6; Downy Woodpecker, 8; Blue Jay, 5; Black-billed Magpie, 5; Black-capped Chickadee, 16; Bohemian Waxwing, 300; Cedar Waxwing, 1; House Sparrow, 40; Evening Grosbeak, 2; Pine Grosbeak, 50-60; Common Redpoll, 1; Snow Bunting, 50. Also seen —1 unidentified owl. (Add: Ruffed Grouse, Ring-necked Pheasant).—Mr. and Mrs. Jas. H. Lang.

INDIAN HEAD, Dec. 30; 6 miles on foot and 20 miles by car in 6 hours; temp. –35° to –25°; wind SW 5-15 mph; clear; 8 inches of snow; 11 species, 98 individuals. Ruffed Grouse, 1; Sharp-tailed Grouse, 5; Gray Partridge, 8; Rock Dove, 4; Great Horned Owl, 1; Snowy Owl, 1; Black-billed Magpie, 6; Black-capped Chickadee, 4; Bohemian Waxwing, 22; House Sparrow, 19; Snow Bunting, 27.—Lorne Scott.

KELVINGTON, Dec. 28; 5 miles by car and on foot about the farmyard for 5½ hours; temp. –25°; snowing lightly; 16 inches of snow; 9 species, 83 individuals. Downy Woodpecker, 5; Black-billed Magpie, 2; Black-capped Chickadee, 6; Northern Shrike, 1; Starling, 14; House Sparrow, 10; Evening Grosbeak, 8; Pine Grosbeak, 25; Snow Bunting, 12. (Add: Hairy Woodpecker, 1, Dec. 30; Blue Jay, 1, Jan. 1; Bohemian Waxwing, 22, Dec. 29; Common Redpoll, 6, Dec. 29).—Dianne Sloan.

KENASTON, Dec. 23; 25 miles by truck and around the farm 9 a.m. to 5 p.m.; temp. 0°; light snow in morning, clearing in afternoon; wind SE 10 mph in a.m.; 2″ snow; 8 species, 273 individuals. Marsh Hawk, 1; Rock Dove, 4; Short-eared Owl, 1; Horned Lark, 2; Black-billed Magpie, 12; House Sparrow, 50; Common Redpoll, 202; Snow Bunting, 1. (Add: Sharp-tailed Grouse, 3, Jan. 1; Gray Partridge, 7, Dec. 22; Northern Shrike, 1, Dec. 30; Hawk Owl, 1, Dec. 21; Bohemian Waxwing, 8, Jan. 1).—P. Lawrence Beckie.

LADY LAKE, Dec. 28; 6 miles on foot; temp. –5°; light wind; snowing lightly; 6 inches of snow; 9 species, 79 individuals. Hairy Woodpecker, 1; Downy Woodpecker, 2; Northern Three-toed Woodpecker, 2; Gray Jay, 1; Common Raven, 3; Black-capped Chickadee, 11; Boreal Chickadee, 3; Common Redpoll, 6; Snow Bunting, 50+.—Donald J. Buckle.

LA FLECHE, Dec. 23; 36 miles across Wood River and Pinto Creek flats; temp. 0°; no wind; light snow; 11 species, 199 individuals. Golden Eagle, 2; Sharp-tailed Grouse, 7; Ring-necked Pheasant, 3; Gray Partridge, 9; Rock Dove, 4; Snowy Owl, 2; Horned Lark, 100; Black-billed Magpie, 2; Starling, 3; House Sparrow, 17; Snow Bunting, 50±.—C. H. Shulver.

LEADER, Dec. 31; 24 miles by car and 3 hours afield; temp. –10°; snow 5″; 4 species, 220 individuals. Sharp-tailed Grouse, 1; Ring-necked Pheasant, 3; Black-billed Magpie, 16; Snow Bunting, 200. (Add: Bald Eagle, 1, Dec. 27; Gray Partridge, 8, Dec. 27; Horned Lark, 2, Jan. 1).—Daisy D. Meyers.

MAPLE CREEK, Jan. 1; 25 miles by car and 1 mile on foot in 3 hours; 10 species, 246 individuals. Sharp-tailed Grouse, 9; Sage Grouse, 1; Gray Partridge, 2; Downy Woodpecker, 3; Black-billed Magpie, 11; Black-capped Chickadee, 9; Bohemian Waxwing, 3; House Sparrow, 200; Evening Grosbeak, 7; Snow Bunting, 1. (Add: 2 unidentified hawks).—Mrs. D. Bromley (compiler), John Bromley, Lloyd Burt, Brigadier Mrs. B. Hopkinson, Mrs. Stockdale, Bill Stockdale, Mrs. E. Thomas. (Steve A. Mann Nature Club Members).

MATADOR, Dec. 20; 65 miles by car and 2 miles on foot; temp. 15°; winds light; light snowfall; 8 species, 357 individuals. Golden Eagle, 2; Sharp-tailed Grouse, 5; Rock Dove, 11; Short-eared Owl, 1; Horned Lark, 182; Black-billed Magpie, 6; House Sparrow, 15; Common Redpoll, 135.—Brian Felske, Bohdan Pylypec, Alan Smith (compiler).

MOOSE JAW, Dec. 26; 75 miles by car and 15 miles on foot; temp. 2°; wind 15 to 19 mph; overcast with light snow; 5 inches of snow; 14 species, 1373 individuals. Gray Partridge, 13; Rock Dove, 22; Hairy Woodpecker, 2; Downy Woodpecker, 2; Horned Lark, 519; Black-billed Magpie, 25; Common Crow, 2; Black-capped Chickadee, 15; Bohemian Waxwing, 66; Starling, 124; House Sparrow, 229; Common Redpoll, 92; Lapland Longspur, 1; Snow Bunting, 261. (Add: Ring-necked Pheasant, 2, Dec. 21 and 30; Great Horned Owl, 1, Dec. 24; Snowy Owl, 1, Dec. 22 and 27; Rusty Blackbird, 1, Dec. 30).—Ken Dodd, John Horton, Pat Kern, Leith Knight (compiler), Cy Knight, Mabel Miller, Gwen Morton, Loanne Myrha, Brian Perret, Ruth and Gordon Silversides, Craig Tufts, Ruth Way.

NIPAWIN, Dec. 26; 6 hours; temp. 0 to –5°; light north wind; dense white overcast; 6″ fluffy snow; 16 species, 529 individuals. Spruce Grouse, 1; Ruffed Grouse, 2; Rock Dove, 2; Great Horned Owl, 1; Hairy Woodpecker, 1; Downy Woodpecker, 2; Gray Jay, 2; Blue Jay, 1; Black-billed Magpie, 10; Bohemian Waxwing, 135; Starling, 6; House Sparrow, 200; Evening Grosbeak, 75; Pine Grosbeak, 26; Hoary Redpoll, 1; Common Redpoll, 64. (Add: Common Goldeneye, 12, Jan. 1; Common Merganser, 3, Jan. 1; Northern Three-toed Woodpecker, 1, Dec. 28; Raven, 1, Dec. 27. Also Great Gray Owl, 1, Dec. 22 seen by Walter and Billie Matthews).—David and Stan Riome.

NOKOMIS, Dec. 26: 32 miles by car

in 3¼ hours; temp. 10°; winds light; light snow with overcast; 7 species, 455 individuals. Rock Dove, 35; Horned Lark, 17; Black-billed Magpie, 2; Starling, 9; House Sparrow, 30; Common Redpoll, 12; Snow Bunting, 350. (Add: Bohemian Waxwing, 7, Dec. 27).—J. W. Hamilton.

OUTLOOK, Dec. 21; temp. 18°; cloudy to clear; 2″ of snow; 4 species, 57 individuals; Black-billed Magpie, 2; Bohemian Waxwing, 25; House Sparrow, 6; Common Redpoll, 24. (Add: Sharp-tailed Grouse, 2, Dec. 20; Gray Partridge, 9, Dec. 25; Horned Lark, 25, Dec. 25).—Harold Kvinge.

PIAPOT, Dec. 26; 3 sq. mi. around farmstead; temp. –30°; strong wind; 10 species, 597 individuals. Sharp-tailed Grouse, 70; Ring-necked Pheasant, 3; Mourning Dove, 1; Horned Lark, 321; Black-billed Magpie, 20; Black-capped Chickadee, 11; Bohemian Waxwing, 43; House Sparrow, 4; Brewer's Blackbird, 1; Tree Sparrow, 123.—Jim Benneto, Lyall Wagner.

PIKE LAKE, Dec. 28; 56 miles by car in 3½ hours, 2 miles on foot in 1 hour, ½ hour at feeding station; temp. –15°; wind light; steady heavy snow; 8-10 inches of snow on the level; 13 species, 1000 individuals. Ruffed Grouse, 2; Sharp-tailed Grouse, 2; Great Horned Owl, 1; Hairy Woodpecker, 3; Downy Woodpecker, 4; Blue Jay, 4; Black-billed Magpie, 5; Black-capped Chickadee, 20±; Bohemian Waxwing, 124; House Sparrow, 2; Common Redpoll, 725; Hoary Redpoll, 2; Snow Bunting, 105. (Add: Ring-necked Pheasant, Cedar Waxwing, Northern Shrike, Evening Grosbeak).—Dr. J. B. Gollop (compiler), Mrs. J. B. Gollop, Mrs. L. M. Hoyte, F. L. Waite, J. A. Wedgwood.

PRINCE ALBERT, Dec. 22; 76 miles by car and 2 on foot in 8½ hours; temp. 2° to 13°; wind N 14 mph; 4 inches of snow in open, 6 inches in the woods; 17 species, 491 individuals. Rock Dove, 1; Hawk Owl, 1; Hairy Woodpecker, 2; Downy Woodpecker, 2; Northern Three-toed Woodpecker, 1; Gray Jay, 2; Blue Jay, 1; Black-billed Magpie, 6; Common Raven, 40; Black-capped Chickadee, 13; Boreal Chickadee, 3; Bohemian Waxwing, 8; House Sparrow, 37; Evening Grosbeak, 82; Pine Grosbeak, 32; Hoary Redpoll, 6; Common Redpoll, 254.—Mr. and Mrs. O. A. Aschim, Elizabeth Beacham and E. Derek Beacham (compiler).

RADISSON, Jan. 1; 1½ miles on foot in 1 hour; temp. 2°; 6″ of snow; 5 species, 1018 individuals. Hairy Woodpecker, 1; Black-billed Magpie, 11; Black-capped Chickadee, 6; House Sparrow, 700; Snow Bunting, 300. (Add: Sharp-tailed Grouse, 7, Dec. 20; Barred Owl, 1, Dec. 20 and 27; Long-eared Owl, 1, Dec. 20).—Bryan Rothenburger.

RAYMORE, Dec. 21; 100 miles by car; temp. 10°; wind SE 15 mph; 8 species, 328 individuals. Ruffed Grouse, 1; Rock Dove, 6; Black-billed Magpie, 4; Black-capped Chickadee, 4; Northern Shrike, 1; House Sparrow, 75; Pine Grosbeak, 7; Snow Bunting, 230. (Add: Great Horned Owl, 3, Dec. 24 and Jan. 1; Hairy Woodpecker, 1, Jan. 1; Bohemian Waxwing, 2, Dec. 22).—Wayne Harris.

REGINA, Dec. 28; 44 miles on foot in 9 hours, and 203 miles by car in 9 hours; temp. –13° to –9°; blizzard conditions; wind NW 30 mph; 4 inches snow cover; 26 species, 3618 individuals. Red-necked Grebe, 1; Pied-billed Grebe, 1; Mute Swan, 10; Whistling Swan, 4; Canada Goose, 454; Mallard, 230; Common Goldeneye, 1; Sharp-tailed Grouse, 1; American Coot, 2; Rock Dove, 29; Great Horned Owl, 1; Snowy Owl, 1; Short-eared Owl, 1; Hairy Woodpecker, 2; Downy Woodpecker, 4; Horned Lark, 88; Black-billed Magpie, 41; Black-capped Chickadee, 19; Red-breasted Nuthatch, 1; Bohemian Waxwing, 230; Northern Shrike, 2; Starling, 17; House Sparrow, 1812; Common Redpoll, 198; Slate-colored Junco, 1; Snow Bunting, 467. (Add: Gadwall, 1, Dec. 20; Rough-legged Hawk, 1, Jan. 1; Gray Partridge, 15, Dec. 26;

Yellow-shafted Flicker, 1, Dec. 20; Brown Thrasher, 1, Dec. 21; Red-winged Blackbird, 3, Dec. 23; Pine Grosbeak, Dec. 26; Purple Finch, 1, Dec. 20.) — Gary Anweiler, Jessie Bailey, Margaret Belcher, Betty Binnie, Greg Bobbitt, Frank Brazier, Bill Brownlee, Eric Cooke, Bill Eddie, Doug Gilroy, Jay Jordan, George Ledingham, Helen Morrison, Mr. and Mrs. J. F. McKay, Marg Patterson, Connie Pratt, Joe Roberts, Barbara Ross, Lorne Scott, Dr. Smith, Doug Smith, Jim Taylor, Ruth Tempel, Holly Wallace, Janie Wilhelm, Dick Yeaton. (Al and Betty Binnie, compilers.)

SALTCOATS, Dec. 26; 10 miles by car and 6 miles on foot in 8 hours; temp. –5° to 10°; wind SE 10 mph; intermittent light snow; 7 species, 113 individuals. Ruffed Grouse, 1; Downy Woodpecker, 1; Black-capped Chickadee, 5; Bohemian Waxwing, 50; Pine Grosbeak, 12; House Sparrow, 35; Black-billed Magpie, 9. (Add: Sharp-tailed Grouse, 5; Gray Partridge, 7; Great Gray Owl, 1; Hairy Woodpecker, 1). — Harold Jowsey, Harriet Jowsey, J. Norman Jowsey, J. R. Jowsey (compiler), Eric Upshal.

SASKATOON, Dec. 26; 35 miles on foot in 27 hours, 246 miles by car in 30 hours, 20 miles by ski-doo in 4 hours; temp. –3° to –7°; wind NW 7 to 10 mph; overcast with snow in the a.m.; clearing briefly in the p.m.; 36 species, 6858 individuals. Mallard, 41; Gadwall, 1; American Widgeon, 1; Goshawk, 1; Rough-legged Hawk, 1; Golden Eagle, 1; Pigeon Hawk, 1; Ruffed Grouse, 3; Sharp-tailed Grouse, 138; Ring-necked Pheasant, 15; Gray Partridge, 183; Rock Dove, 130; Great Horned Owl, 2; Short-eared Owl, 13; Yellow-shafted Flicker, 1; Hairy Woodpecker, 12; Downy Woodpecker, 5; Horned Lark, 90; Blue Jay, 13; Black-billed Magpie, 169; Black-capped Chickadee, 48; White-breasted Nuthatch, 1; Red-breasted Nuthatch, 1; Robin, 3; Bohemian Waxwing, 2846; Cedar Waxwing, 6; Northern Srike, 1; Starling, 6; House Sparrow, 1493; Rusty Blackbird, 1; Evening Grosbeak, 17; Pine Grosbeak, 23; Hoary Redpoll, 17; Common Redpoll, 1492; Slate-colored Junco, 2; Snow Bunting, 81. (Add: Snowy Owl, 1, Dec. 22, 31; Red-winged Blackbird, 10, Dec. 28).— Saskatoon Natural History Society: Claude Anderson, Rod and Michael Bantjes, Bob, Jeff and Joan Besant, Edward and Ray Bisha, Randy and Vern Bowman, Wm. Bruchs, John Cartwright, Pern Cordery, Mrs. Molly Denson, Annabel and Louise Denson, Mrs. Rosalie Early, Ed Ellaschuk, Bill and Kim Epp, Claire and Julie Ewing, L., Danny and Gerald Fitzgerald, R. Flint, Jon and Peter Gerrard, Michael A. Gollop, Dr. and Mrs. J. B. Gollop, David V. Houston, Dr. and Mrs. C. Stuart Houston, Dr. A. Lambert, Kim and Ronald A. Lamont, Dennis McBride, Greg Michalenko, Allan Moulain, Mrs. J. B. Nicholson, Arnold Nijssen, David Nowasad, Bohdan Pylypec, Ron Shore, Stanley J. Shadick, Jas. A. Slimmon, Alan R. Smith, Mr. and Mrs. Thos. R. Smith, Fred Waite, Jas. A. Wedgwood.

SKULL CREEK, Dec. 27; 2 miles on foot down the creek; temp. –25°; 10 species, 126 individuals. Sharp-tailed Grouse, 9; Ring-necked Pheasant, 2; Gray Partridge, 7; Hairy Woodpecker, 4; Downy Woodpecker, 2; Horned Lark, 28; Black-billed Magpie, 9; Black-capped Chickadee, 12; Bohemian Waxwing, 20; House Sparrow, 23. (Add: Golden Eagle, 2, Dec. 21; Snowy Owl, 1, Dec. 21; Common Redpoll, 20, Dec. 23; Snow Bunting, 1, Dec. 21).—Mrs. S. A. Mann (compiler), Robert and Betty Mann, Patti, Jim and Dougie Mann, Helen, Ray, Michelle and Tommy Schuler, Peter Swain.

SPIRIT LAKE, Dec. 26; 2 miles on foot through poplar and spruce bush, and around yard in 4 hours; temp. 0°; cloudy with clear periods; 8″ snow; snowflurries; wind light; 14 species, 73 individuals. Ruffed Grouse, 3; Great Horned Owl, 2; Pileated Woodpecker, 1; Hairy Woodpecker, 4; Downy Woodpecker, 6; Black-billed Magpie, 1; Black-capped Chickadee, 30; White-breasted Nuthatch, 2; Bohemian Waxwing, 8;

Northern Shrike, 1; Evening Grosbeak, 5; Pine Grosbeak, 3; Common Redpoll, 5; Snow Bunting, 2. (Add: Robin, Dec. 21).—Joyce Gunn, Mrs. Gunn.

TUBEROSE, Dec. 26; 16½ miles by car and ½ mile on foot; temp. –20°; wind NW 10 mph; visibility good; 6″ of snow; 6 species, 66 individuals. Pigeon Hawk, 1; Gray Partridge, 39; Black-billed Magpie, 1; Bohemian Waxwing, 3; House Sparrow, 7; Common Redpoll, 15.—C. A. Matthews.

VAL MARIE, Dec. 21; 8″ snow; 5 species, 12 individuals. Golden Eagle, 1; Sharp-tailed Grouse, 2; Horned Lark, 5; Starling, 1; Snow Bunting, 3. (Add: Rough-legged Hawk, 1, Dec. 20; Unidentified Falcon, 1, Dec. 25; Ring-necked Pheasant, 10, Dec. 31; Gray Partridge, 5, Dec. 22; Short-eared Owl, 1, Dec. 20; Black-billed Magpie, 2, Dec. 20; Black-capped Chickadee, 1, Dec. 31; Bohemian Waxwing, 1, Dec. 26; House Sparrow, 12, Dec. 22; Red-winged Blackbird, 1, Dec. 25; Common Redpoll, 6, Dec. 31; Tree Sparrow, 1, Dec. 25).—J. David Chandler.

WOLSELEY, Dec. 31; 20 miles by car; temp. –10°; clear; 5 inches of snow; 10 species, 84 individuals. Ruffed Grouse, 2; Great Horned Owl, 1; Hairy Woodpecker, 1; Downy Woodpecker, 2; Black-billed Magpie, 2; Black-capped Chickadee, 4; Starling, 1; House Sparrow, 50; Common Redpoll, 20; Snow Bunting, 1. (Add: Short-eared Owl, 2, Dec. 23; Horned Lark, 20, Dec. 27; Bohemian Waxwing, 16, Dec. 28).—J. Donald Hayward.

YELLOW CREEK, Dec. 30; 6 miles on foot for 6 hours; temp. –28° to –15°; wind W 15 mph; overcast with light snow; 24 inches of snow; 6 species, 191 individuals. Downy Woodpecker, 1; Blue Jay, 3; Black-billed Magpie, 5; Black-capped Chickadee, 2; Pine Grosbeak, 57; Common Redpoll, 61.—Derwent Mazur.

YORKTON, Dec. 26; 85 miles by car and 13 miles on foot for 42 hours; temp. 1° to 4°; wind SSE 10 mph dropping in p.m.; 1 inch snowfall during the day; 4 inches of snow; 15 species, 2895 individuals. Sharp-tailed Grouse, 30; Gray Partridge, 1; Rock Dove, 37; Great Horned Owl, 1; Snowy Owl, 2; Downy Woodpecker, 2; Horned Lark, 1; Black-billed Magpie, 37; Black-capped Chickadee, 22; Bohemian Waxwing, 106; Starling, 24; House Sparrow, 258; Pine Grosbeak, 2; Common Redpoll, 870; Snow Bunting, 1500.—Wm. Anaka, Lorne Lepp, Larry Morgotch, Irving and Gordon Pearce, Wm. Popowich, Frank Switzer (compiler), Harold Wilkinson (Yorkton Senior Natural History Society); and Keith Monette (Yorkton Junior Natural History Society).

EDMONTON, ALTA. Dec. 22; 39 miles on foot in 21¼ hours, and 203 miles by car in 22¾ hours; temp. 1° to –11°; clear; wind NW 4 mph; 6 inches of snow; 29 species, 6,131 individuals. Mallard, 42; Common Goldeneye, 18; Pigeon Hawk, 1; Ruffed Grouse, 1; Ring-necked Pheasant, 15; Gray Partridge, 96; Rock Dove, 70; Great Horned Owl, 1; Snowy Owl, 1; Hawk Owl, 1; Short-eared Owl, 4; Yellow-shafted Flicker, 1; Pileated Woodpecker, 2; Hairy Woodpecker, 7; Downy Woodpecker, 6; Black-backed Three-toed Woodpecker, 1; Blue Jay, 30; Black-billed Magpie, 119; Black-capped Chickadee, 82; Golden-crowned Kinglet, 1; Bohemian Waxwing, 5,000; Northern Shrike, 1; Starling, 16; House Sparrow, 305; Evening Grosbeak, 19; Pine Grosbeak, 10; Hoary Redpoll, 2; Common Redpoll, 179; Snow Bunting, 100. (Add: Pintail, Golden Eagle).—A. Allan, T. Balacko, K. Ball, H. Campbell, P. Demulder, R. Heath, M. Hennie, O. Hohn, H. Horton, B. Horton, R. Lister, A. MacGregor, J. Park, D. Robinson, H. Smith, D. Spalding, P. Taylor, P. Thompson, R. Turner (compiler).

FORT SMITH, N.W.T., Dec. 29; 40 miles by car in 2 hours; temp. –17°; wind N 15 mph; overcast; 12 inches of snow; 4 species, 38 individuals. Willow Ptarmigan, 4; Rock Dove, 7; Raven 16; Hoary Redpoll, 11. (Add: House Sparrow, 6, Dec. 27; Pine Grosbeak, 20, Dec. 27).—Elsie, Ernie and Pamela Kuyt.

HYBRIDISM IN THE EASTERN AND MOUNTAIN BLUEBIRDS

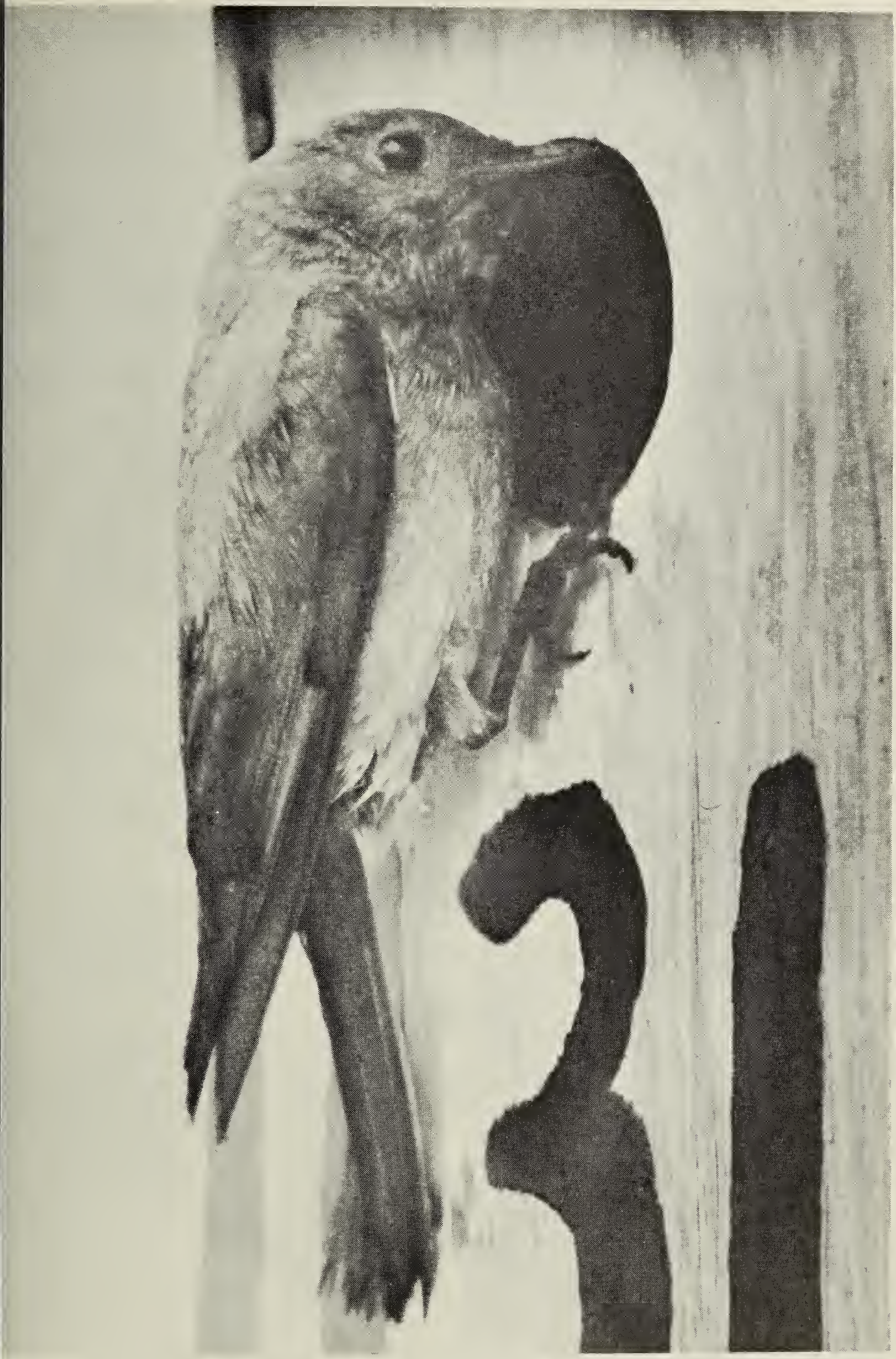
by **John Lane,** 1701 Lorne Avenue, Brandon, Manitoba

On May 14, 1967, a field party from the Brandon Junior Birders Club was checking nest-boxes in an area running through the towns of Oak Lake, Virden and Elkhorn. Nest-box #1131, located five miles northwest of Oak Lake, was occupied by a female Mountain Bluebird and was checked as such by the juniors. Located as we are in mid-continent, we find both Eastern Bluebirds *(Sialia sialia)* and Mountain Bluebirds *(Sialia currucoides)* taking advantage of our nest-boxes, of which 1700 were in operation on the above date.

On May 26, I was driving past nest-box #1131 (or nest #1131) and noticed the lid had blown off. When replacing it I verified that a hen Mountain Bluebird was incubating seven eggs, and I was about to drive away when a male bluebird flew into the area. He presented a most unusual spectacle, his breast being a motley of the rusty-red of an Eastern Bluebird and the azure-blue of the Mountain species. To prove that he was the mate of the sitting hen Mountain Bluebird, I flushed her from the nest, and very shortly the odd-appearing little male (he was noticeably smaller than the female) escorted her back to the nest-box, and even flew to the hole to look in at her. After a close scrutiny through my glasses I decided that he must be a hybrid between the Eastern and Mountain species of bluebirds, an important find as I later learned, for there appeared to be no published record of hybridism in the thrush family in the wild in North America. (A report on this find was later made by me at the 85th annual meeting of the American Ornithologists' Union at Toronto in August, 1967, and a note has been published in the *Auk* (1968, 85:684). The information that follows supplies details of the study.)

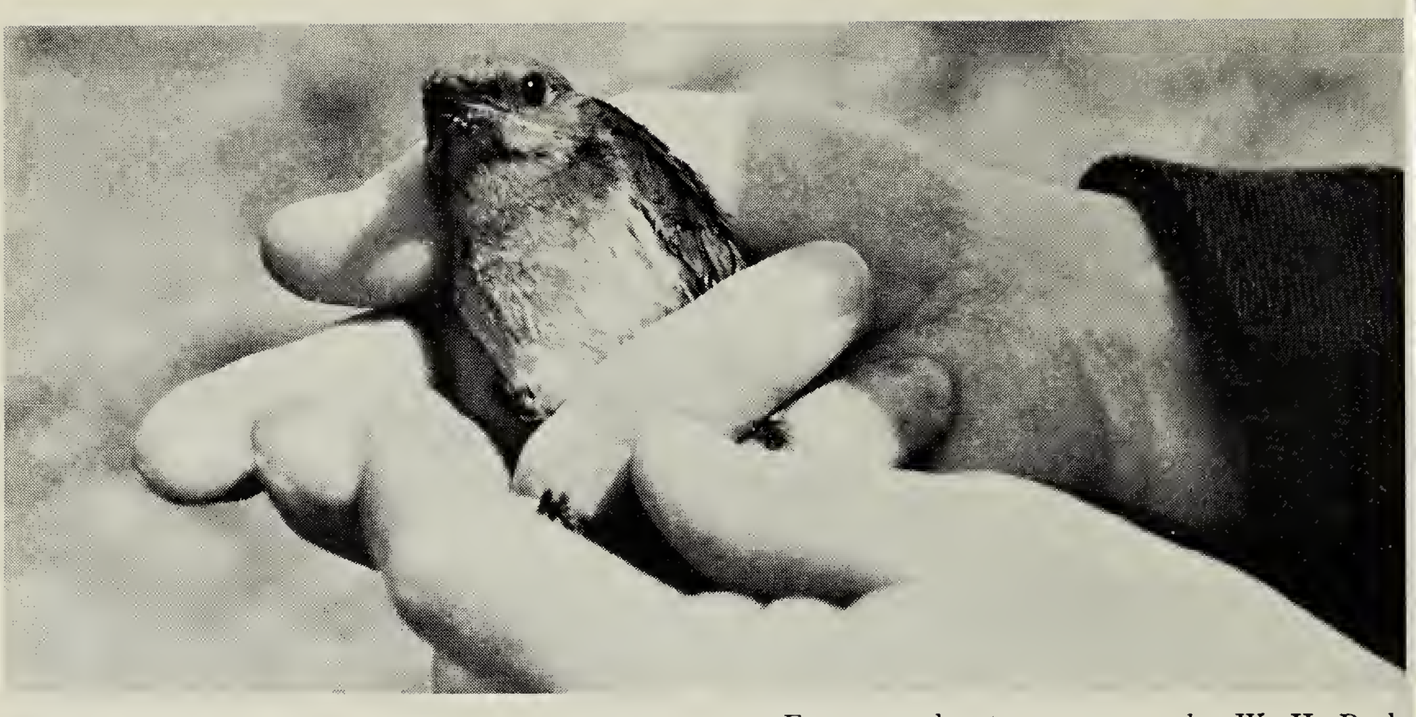
The next morning my wife and I returned to the area and noticed a female Eastern Bluebird defending nest #1176 from a pair of Tree Swallows. It seemed odd that no mate came to her aid, and later on we had our suspicions aroused when the hybrid male joined this female Eastern near her nest, which was adjacent to nest #1131 and only 150 yards from it. Later in the day we witnessed a strange bit of by-play: both the hybrid male and his plump Mountain mate flew west along the fenceline till they arrived at the home of the female Eastern bird, where they perched on the fence wire. Very shortly the Eastern hen joined them, and with the female Mountain mate placidly watching the proceedings, the Eastern hen began a series of hops which brought her close to the hybrid male. He in his turn commenced a series of hops to maintain a distance between himself and the amorous hen. When he ran out of wire because of the next fence post, he would hop over the pursuing Eastern bird, which would simply reverse the direction of her hops. After some minutes of this hot pursuit the male abruptly broke off the affair and flew back to his own area, closely followed by his Mountain mate. The nest day, I finally saw the female Eastern bird fly to the telegraph wires above her nest where shortly she was joined by the hybrid. After several false starts copulation took place, proving him to be a polygamist. (I can find only one published record of polygamy in the bluebirds: Harry W. Power (1966. Biology of the Mountain Bluebird in Montana. *Condor,* 68-351-371 noted one case of polygamy in the Mountain Bluebird in 1963.) By June 2 the female Eastern Bluebird had completed her clutch of five eggs and incubation had begun.

One day earlier, June 1, the Mountain hen hatched out six young; the polygamist proved to be a devoted parent, doing his full share of providing food and keeping the nest tidy.



From a color transparency by J. Lane.
Courtesy Manitoba Museum of Man and Nature

Hybrid Eastern-Mountain Bluebird male at nest box no. 1131



Hybrid male bluebird, June 7, 1967

From a color transparency by W. H. Beck.
Courtesy Manitoba Museum of Man and Nature

Even before the young arrived he had displayed a remarkable aggressiveness, and this display reached a new crescendo after the hatching. Any attempt to approach the nest-box resulted in a fierce defense flurry, including much snapping of the bill and a torrent of hoarse, angry "Chupps".

On June 7, with the help of Dr. Robert W. Nero and Mr. W. Harvey Beck, both from the Manitoba Museum of Man and Nature, Winnipeg, the hybrid was captured alive and examined in the hand. The following notes on its plumage were made at that time:

"The most conspicuous feature of the hybrid specimen is the blue and red marking of the breast. In many ways the hybrid seems closer to an Eastern Bluebird, with blue replacing most of the red of the breast. The blue color of the back and wings appears decidedly closer to that of the Eastern Bluebird. The upper throat and breast are largely pale blue, though many of the feathers have reddish tips. Reddish-tipped feathers form a noticeable pattern up the middle of the throat to the base of the bill. (By June 28, when the bird was collected, these were worn and hence less conspicuous). The lower breast appears as a reddish band, though these feathers are pale blue towards the base. The red color also runs down the flanks (as in the Eastern species) and again these feathers are blue towards the base — some are almost wholly blue.

"Two additional features may be noted: the outer tail feathers have a narrow white margin on both inner and outer vanes, a characteristic shared with the Eastern Bluebird. Similarly, the metacarpal feathers of the hybrid are chiefly of a whitish color as in the Eastern Bluebird, rather than blue as in the Mountain species."

The hybrid nature of the specimen is also clearly shown by its size, which is intermediate in nearly all respects between the Eastern and Mountain species (Table 1).

It is interesting to note that during the half-hour her mate was held captive, the Mountain hen suspended her feeding chores, spending the time alternately perching on a fence post near her nest, and anxiously flitting about the area.

On June 17 Nero and Beck returned, accompanied by Dr. Roger M. Evans of the Zoology Department, University of Manitoba. Dr. Evans taped the voice of the hybrid, as well as the voices of male Eastern and Mountain bluebirds from nearby nest-boxes. On this same day Dr. Nero took the six hybrid Mountain nestlings to Winni-

TABLE I. Comparison of hybrid with Eastern and Mountain Bluebirds

	Eastern Bluebird May 25, 1935. Caddy Lake, Man. J. D. Soper	Hybrid Bluebird June 28, 1967 Brandon West J. Lane	Mountain Bluebird April 25, 1949 Brandon, Man. R. D. Bird
Culmen	11.3 mm.	11.0	10.6
Tarsus	20.0	20.5	24.5
Wing (chord)	100.0	104.3	112.5
Tail	62.0	66.5	70.0

peg, where they were raised for further study. (Four survivors are now with Dr. David C. Krieg of New York for continuing studies of plumages, behaviour, etc.). When we transferred the young from the nest to a container the parents outdid their earlier demonstrations, darting frenziedly in every direction and maintaining a constant din of vocal protest. As the final nestling disappeared from view, the Mountain mother began carrying bits of grass to the nest-hole—an interesting reaction to a disturbing situation.

The hybrid was destined to become a study specimen for the Manitoba Museum of Man and Nature, but we had agreed that he should be spared until we learned if he would also assist his Eastern mate with her young, if and when they hatched. I had thought it likely the hybrid and the Mountain hen would renest in nest-box #1131, but they vanished after the loss of their first brood.

Meanwhile the Eastern hen incubated her eggs for 16 days, then abandoned the nest, the eggs in later tests proving infertile. This bird immediately mated with a normal male Eastern Bluebird and moved into nest-box #1131 where a healthy family of five was raised. Thus it would appear that the hybrid could fertilize the eggs of the Mountain hen but not those of the Eastern bird.

On June 22, Wayne Miller and I located the hybrid male and the Mountain hen moving into nest-box #781, located over two miles west of their old nest. Since there was no chance of the hybrid returning to his former area to aid in the raising of a possible family from his Eastern mate's eggs, I arranged for Nero and Beck to make a final trip to the new nest-site on June 28. We collected both the hybrid and his Mountain mate, and found that the hen had already deposited four eggs in her new nest. We found that the hybrid male weighed seven grams less than the female. Several other features in the hybrid are worth noting: in both posture and silhouette he differed from the two species; when perched on a post he squatted on his heels, giving him a penguin-like appearance; in silhouette he was halfway between the humpty-dumpty shape of the Eastern and the longer, slimmer build of the Mountain species.

His aggressiveness in nest defense marked him as more Mountain than Eastern, which latter is a much more timid bird. The hybrid's song, both in volume and in clarity of enunciation, was more Eastern than Mountain, the latter uttering a softer, more slurry refrain. Yet Dr. Evans' sonograms show that in pitch the song of the hybrid was actually closer to that of the Mountain Bluebird: measured in averages of frequencies (cycles per second) the hybrid had a figure of 1,612, the male Mountain had 1,643, and the male Eastern a much higher 1,952.

The author wishes to acknowledge with thanks the aid given by Dr. Robert W. Nero, Mr. W. Harvey Beck, Dr. Roger M. Evans, Mr. Allen Lenny, and three members of the junior club, Wayne Miller, Richard Patterson, and David Randall. And a special salute to his wife for her tireless help.

REMINISCENCES OF BIRD BANDING AT DAVIDSON, SASKATCHEWAN

by **Albert C. Lloyd,** Carnegie Museum, Pittsburgh

After 45 years it is difficult to go back in memory and bring to life the early history of bird-banding at Davidson. My father, Reuben Lloyd, was one of the early settlers of the Davidson District, arriving there in 1904 or 1905 from Illinois. As a boy he had been raised on a farm and had become interested in wild life, mainly the study of birds. Sometime about 1914, he was offered a male White-tailed Deer that had been captured swimming from one of the islands to the mainland in Last Mountain Lake. This was the start of what later was known as The Lloyd Private Game Reserve, which he maintained throughout his lifetime. The Reserve was located a half-mile north of the town of Davidson and consisted of about five acres surrounded by a nine-foot-high page-wire fence. He constructed a low earthen dam across a shallow ravine forming a pond some half-mile long and maybe 200 feet wide at the widest point. This was also included in the reserve and filled each year by the run-off from the melting snow. The pond was a great attraction for migrating and resident birds. In the enclosed part of the Reserve he maintained a small herd of deer and from time to time several Prong-horned Antelope were kept. Each spring several fawn deer would be born. In 1916 or 1918 the first antelope was born in captivity for which the Dominion Government had any record. The pair of twins were later killed by a hailstorm that passed through the area. I remember there is a published record put out by the Dominion Government along with a picture of my father taken with the twins. Also in this enclosure my father kept Canada Geese, White-fronted Geese and later Blue and Snow Geese, and from time to time, Whistling Swan and numerous species of ducks including Mallards crossed with domesticated English Call Ducks. Many of the ducks were migratory and no attempt was made to keep them through the cold and bitter winter. It was in such surroundings that I spent my early life and received training from my father.

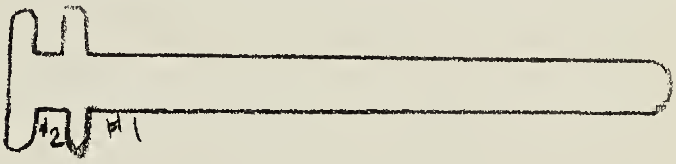
How dull the winter months were back in the twenties and early thirties! Our wintering birds included the Sharp-tailed Grouse, Prairie Chicken, an occasional Snowy Owl and later the Hungarian Partridge. To this list could be added the House Sparrow and the so-called Rock Dove. I cannot help but marvel at the number of wintering birds given by the *Blue Jay*

Reuben Lloyd and duck trap at Davidson sanctuary, 1932.

Christmas Count compared with the years when I was a boy. We always ooked forward to the last week in February when we could usually see our first Horned Lark of the new year. It would be at least a month or so before the Tree Sparrow would report. With the early spring thaws, the forepart of April would bring the vanguard of the vast number of migrating birds with the peak reaching about the third week of May with the Warblers. I wonder if the Lapland Longspur still migrates across the fields in the large numbers that they did then? I have seen flocks of thousands following on the heels of one another.

During the winter of 1925 - 1926 we had a small invasion of redpolls. This s the only record I have of their appearance at Davidson. From December 30, 1925 to March 20, 1926, we were able to trap and band a total of 37.

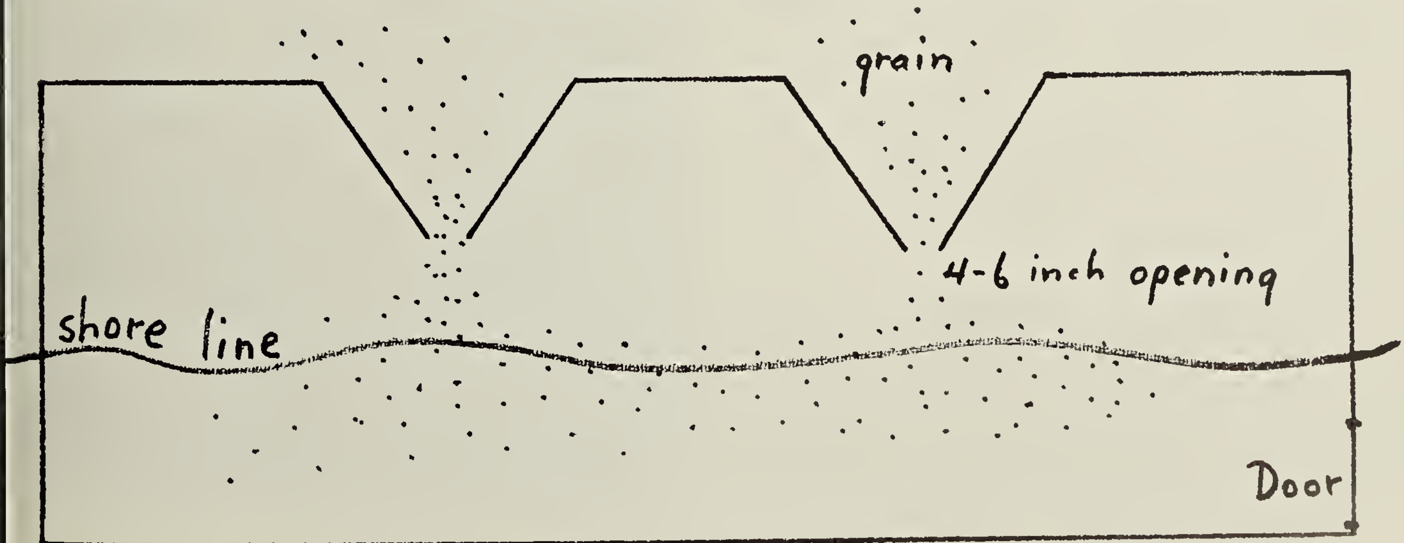
Sometime in the early spring of 1923 my father told me that the Canadian Government and the Government of the United States had agreed to conduct a bird-banding program and that he had made application for a banding permit. In due time the permit and a supply of bands arrived. The small bands that were first used were much like those in use today. However, bands for larger birds were made of a long strip of metal about three inches long with a number stamped on and "Nat. Biol. Sur. Wash. D.C." On each side near the left end were two sets of lugs—two on each side. You formed the metal around the leg of the bird to be banded and crimped the set of lugs #1 over the band. Then you bent the metal back over these lugs and crimped the second set of lugs. Any excess metal was trimmed off and the bird released.



I wonder how many bands were put on too tightly or too loosely, and injured the bird's leg.

The Double-crested Cormorants were banded as nestlings on a small island at the north end of Last Mountain Lake. However, we caught most of our ducks by driving them out of the water into a pen before they could fly. We built a number of duck traps; the last one was a pen 10 feet long, six feet wide, and four or five feet high. The wooden framework of 2 x 2's had chicken wire stretched over it. Into one side we extended two open-mouthed V's some three feet. This we set on the edge of a shallow pond bank so that the V's were in the water. We baited both the shore inside the trap and the V's leading into the trap with grain. The ducks entered the trap, became excited, and simply swam past the funnel openings. We would then enter the trap through a door in the end, band the ducks, and release them.

Our first small bird traps were simple drop traps made from a framework three feet square and about six inches high, covered with window



screen. This was held up by a stick to which a long string was tied. For bait we used weed seed that could be found around any straw stack. When several birds were feeding under the trap, we pulled the string and the stick would be pulled out and the trap dropped over the bird. In one corner of the trap we had a small door that could be opened and a small cage placed so that the bird could be driven into it and be caught.

We soon learned of a better way to use the same trap. Drive a 2 x 2 or other wooden stake into the ground leaving about one inch of stick above ground. To this a mouse trap was nailed. Then from this trigger to each back corner of the drop trap we fastened a thread just tight enough so the trap could be set. The prop was then placed on the very edge of the trap so when sprung, the jaw of the mouse trap would knock the stick from under the trap and drop over the bird. This worked very well and we caught many ground-feeding birds this way.

Of course there were other ways we captured adult birds. Sometimes we would catch flickers in their nesting holes in fence posts or telephone poles. Swallows we caught in grain storage bins, grackles in nesting boxes. Once I caught a pair of nesting shrikes by putting a noose on the end of a pole and dropping it over their heads. We also used a lady's hair net by tying two short and one long string to it so that they all joined together. The centre of the net was then fitted into the cup of a nesting bird. A light tug on the long string and you had the bird inside the net. We didn't use this very often since we were afraid of destroying the nest or that the bird might desert the nest.

SASKATCHEWAN BIRD BANDERS*

REUBEN AND A. C. LLOYD OF DAVIDSON

by **C. Stuart Houston,** 863 University Drive, Saskatoon

Reuben Lloyd began banding birds at Davidson on May 5, 1923. For the first ten years he was assisted by his son Bert, now a Supervisor with the Carnegie Museum in Pittsburgh, Pennsylvania. No birds were banded in 1930, 1933 and 1936 and only two were banded in 1937.

His log book, kindly loaned by his son Albert C. Lloyd, records 3177 individuals of 73 species. At first, bands evidently were not issued in numerical order on wires or strings as they are today, for in the early years Mr. Lloyd applied them in random order — e.g. using number 73, then 62, then 66.

Some evidently escaped entry in the record book, as banding and recovery data are available on Fish and Wildlife Service printouts or were published in the *Canadian Field-Naturalist*, for 14 individuals not recorded in the banding log book. Ten of the 14 were banded in the first year 1923

Reuben Lloyd

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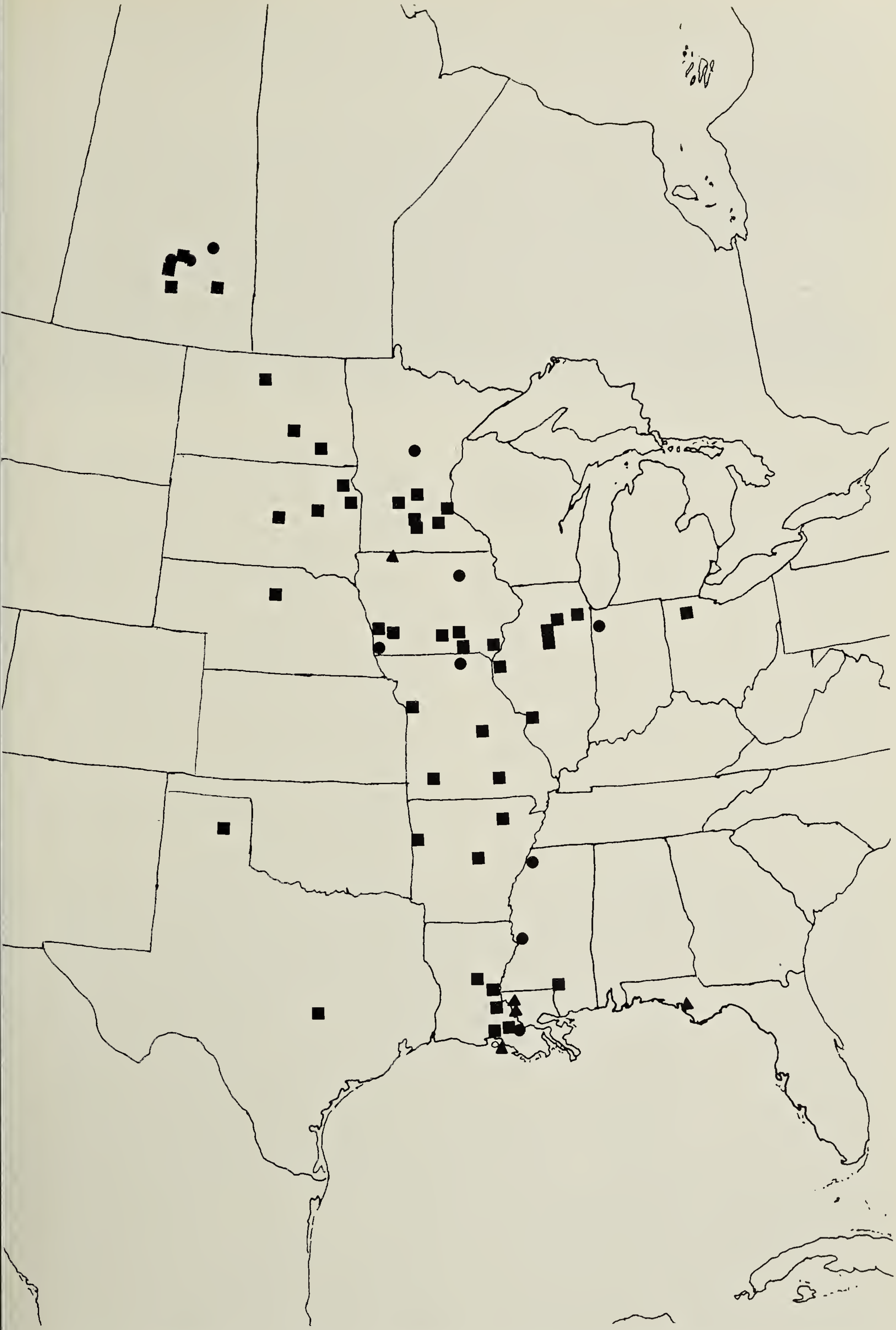
* No. 12 in a series of biographies of Saskatchewan bird banders.



Recoveries of Double-crested Cormorants banded at Last Mountain Lake by Reuben and A. C. Lloyd, 1923-1932. Note: Squares represent direct recoveries (same year). Triangles — January 1 to June 30 of following year. Circles — more than one year old.

Lloyd Sanctuary, Davidson

and all 14 are listed in the accompanying table as "plus" birds since they cannot be used to calculate the true recovery percentages.

As will be seen from the enclosed table, the Lloyds' major interest was waterfowl. Not only did they capture and band wild ducks, but Reuben Lloyd raised captive Mallards crossed with English Call Ducks. These were then released to migrate south, perplexing hunters in their white, dark, grey and speckled white plumages. These released hybrid birds showed a higher recovery rate than pure Mallards; for 1924 and 1925, there were 31 recoveries from 76 cross ducks (41%) whereas in the same period there were only 9 recoveries from 50 pure Mallards (18%). The hybrid domesticated birds followed the same migration route as the wild Mallards.

No less than 62 recoveries were received from the 303 Double-crested Cormorants banded at the north end of Last Mountain Lake in 1923, 1924, 1925, 1928 and 1932; of these 195 were banded in 1928 alone. The locations of these cormorant recoveries are shown on the enclosed map. His Swainson Hawk and Bronzed Grackle (Common Grackle) recoveries were included in recent *Blue Jay* reports.

Other interesting recoveries were:

Canada Goose. Released July 30/23. Died after injuries June 30/24, Markham, Texas.

Gadwall. Banded Aug. 31/32. Shot Dec. 16/35 near Winfield, West Virginia.

Lesser Scaup. Aug. 24/27. Shot Dec. 7/27, Harding's Wharf, Chesapeake Bay, Virginia.

Killdeer. Banded June 27/28. Found Nov. 18/28, Butler County, Nebraska.

Slate-colored Junco. Sept. 30/25. Found dead before March 19/26, Forest City, Iowa.

White-crowned Sparrow. Sept. 16/24. Trapped by another bander, Mrs. Carman, at Grand Junction, Colorado, Jan. 30/33.

Returns included Barn Swallows at 1 and 3 years, one Common Grackle at 2 years, one Yellow-shafted Flicker at 2 years and a Pintail at 3 years. Seventeen Mallards were retrapped at their place of banding in succeeding years, 14 the following year and 1 each at 2, 3 and 4 years.

Reuben Lloyd was born at Broadlands, Illinois on October 11, 1871 and moved to Davidson in 1904. He was a strong supporter of the provincial museum and contributed a number of specimens of special interest. On his death on October 16, 1942, an editorial in the Regina *Leader-Post* stated that he "will long be remembered by sportsmen of the province for his good work as a member of the fish and game advisory committee and as a man whose hospitality and capacity for friendship was unlimited."

BANDING BY REUBEN LLOYD

Species	Number Banded	Number Recovered
Eared Grebe	3	1
Double-crested Cormorant	303	62
Canada Goose	15	5
Mallard and Mallard-Call	710	137+8
Gadwall	33	1
Baldpate (Am. Widgeon)	62	6+1
Pintail	123	8+1
Shoveler	21	2
Blue-winged Teal	16	1
Lesser Scaup	8	1
Swainson's Hawk	3	2
Killdeer	12	1
Yellow-shafted Flicker	39	2
Black-billed Magpie	2	1
Robin	62	1
Western Meadowlark	13	0+1
Common Grackle	166	8+3
Slate-colored Junco	229	1
White-crowned Sparrow	211	1

No recoveries from: Great Blue Heron, 2; Green-winged Teal, 36; Canvasback, 1; Ferruginous Hawk, 4; Sharp-tailed Grouse, 1; Gray Partridge, 3; Sora, 1; Coot, 2; Willet, 9; Least Sandpiper, 2; Marbled Godwit, 5; Wilson's Phalarope, 11; Ring-billed Gull, 37; Common Tern, 32; Short-eared Owl, 2; Yellow-bellied Sapsucker, 1; Eastern Kingbird, 8; Horned Lark 9; Barn Swallow, 54; Common Crow, 8; House Wren, 1; Catbird, 2; Brown Thrasher, 1; Hermit Thrush, 13; Gray-cheeked Thrush, 6; Sprague's Pipit, 1; Loggerhead Shrike, 11; Myrtle Warbler, 2; Wilson's Warbler, 1; Redstart, 1; Yellow-headed Blackbird, 35; Red-winged Blackbird, 11; Rusty Blackbird, 1; Brewer's Blackbird, 55; Cowbird, 7; Purple Finch, 1; Redpoll, 37; Savannah Sparrow, 4; Sharp-tailed Sparrow, 1; Vesper Sparrow, 3; Oregon Junco, 5; Tree Sparrow, 329; Chipping Sparrow, 1; Clay-colored Sparrow, 12; Harris' Sparrow, 86; White-throated Sparrow, 91; Fox Sparrow, 2; Lincoln's Sparrow, 131; Swamp Sparrow, 14; Song Sparrow, 31; Lapland Longspur, 2; Chestnut-collared Longspur, 2; Snow Bunting, 4.

I wish to express my appreciation to Morley W. Coxworth of Davidson and Albert C. Lloyd of Pittsburgh for providing all the information used above.

Frank A Parks Photo
Sent in by Ernie Symons

Reuben Lloyd and Canada Goose on nest at Davidson

THE KNOT AS A MIGRANT IN SOUTHERN MANITOBA[1]

by **Martin K. McNicholl,** Zoology Dept., University of Manitoba, Winnipeg

Godfrey (1966) summarizes the status of the Knot *(Calidris canutus)* in Manitoba, by calling it an uncommon transient in interior Manitoba and a common transient on the west coasts of James and Hudson Bays. Because of its regular occurrence in spring migration along the west coast of Hudson Bay in northeastern Manitoba, the Knot is included on the latest check-list of Manitoba birds (Nero and Hosford, 1967) as a "regular species", that is, "believed to occur every year in some part of the province during one or more of the seasons." As indicated by Godfrey's statements, however, it is considered to be uncommon or rare in the southern part of the province.

I was therefore surprised on May 30, 1967 to see a flock of 12 Knots, plus three individual Knots, among a group of shorebirds, including 200 Black-bellied Plover *(Squatarola squatarola)*, 10 American Golden Plover *(Pluvialis dominica)*, 15 Ruddy Turnstone *(Arenaria interpres)*, two Dunlin (*Erolia alpestris)*, and three Sanderling *(Crocethia alba)*, which were feeding on "borrow pits" (mud pits created by construction activity) at the University of Manitoba Field Station at Delta, Manitoba. The following characteristics of the 15 Knots were observed through 8 x 42 binoculars: "chunky; larger than turnstones, smaller than Black-bellied Plovers, and closer in size to Golden Plovers; orange-red breast; no ventral spots or streaks; short straight bill, about equal in length with head; in flight, some white on wings and rump, but not extensive". These features agree with the characteristics given for the Knot by Peterson (1947). The birds were again seen later that afternoon by Dr. Roger M. Evans and the writer, but were not seen subsequently.

Although Godfrey refers to the Knot as uncommon in interior Manitoba, and the A.O.U. committee (1957) says the spring flight passes "rarely through the interior" (p. 193), earlier writers are not in agreement as to its status in southern Manitoba. Seton (1886, p. 151) calls it a "common migrant along Red River", presumably on the authority of W. L. Hine of Winnipeg and/or C. W. Nash of Portage la Prairie. However, in the second installment of the same paper (1886, p. 329), he quotes R. H. Hunter as saying, "I have never seen the Knot along Red River, but have seen large flocks of the species west of Brandon." Cooke (1910) says "the species is unrecorded in the whole interior of Canada west of Hudson Bay", but Macoun and Macoun (1909) call it "a tolerably common migrant in Manitoba but rare farther west." Taverner (1943) records it as "migrating throughout the prairie interior." Possible reasons for these conflicting statements are discussed below.

More recent observations of this species in southern Manitoba are shown in Table 1, and the locations of these observations are plotted in Figure 1.

For an uncommon species, the relatively large number of flocks compared to individual birds among these records is striking. Hunter's observations west of Brandon were of "large flocks"; Cartwright's Whitewater Lake observation is recorded in the plural ("Knots were observed") in such a way as to imply a flock or flocks; Gibson's observation at Lockport was of 21 birds; Mossop, Press, and Wallace saw a total of 12 at the Shoal Lakes; and Dr. Evans and I saw 15 at Delta. Only Mossop's ob-

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[1] Publication No. 9 of the University of Manitoba Field Station, Delta.

Table 1. Recent observations of the Knot in southern Manitoba.

Date	Number	Location	Observer (s)	Reference Source
July 17, 1966	1	Oak Lake	David Braddell	Mossop, 1966
June 2, 1968	1	Oak Lake	David R. M. Hatch	D. R. M. Hatch, pers. comm., 1966
Last week of May, 1925	More than 1	Whitewater Lake	B. W. Cartwright	Lawrence, 1925
June 2, 1951	1 possible	Whitewater Lake	H. G. Duncan	H. G. Duncan, pers. comm.. to R. W. Nero, 1968
May 27, 1934	not given	Brandon	C. L. S. Allward	Lawrence, 1934 a
May 24, 1930	not given	Delta	C. L. Broley	Lawrence, 1930
May 30, 1967	15	Delta	R. M. Evans M. K. McNicholl	this paper
May 20, 1967	5 7	West Shoal Lake East Shoal Lake	Harold Mossop, Peter M. Press, Lorne Wallace	Mossop, 1967 and pers. comm., 1968
May 25, 1947	21	Lockport Slough	Orland P. Gibson	Lawrence, 1947
June 3, 1934	1	Whittle's Point, Lake Winnipeg (actually somewhat north of)	H. Mossop	Lawrence, 1934 b H. Mossop, pers. comm., 1968

servation at Whittle's Point, Duncan's sighting at Whitewater Lake, and the Oak Lake observations of Braddell and of Hatch were definitely of single birds, although Broley's Delta observation and Allward's Brandon observation may have been of single birds also. Thus a high proportion of the southern Manitoba Knot observation is of flocks. This relatively high frequency of flocks may explain the earlier reports of its being common in migration in southern Manitoba or across the prairie, as writers with little information on this species might assess reports of large flocks as being indicative of general abundance, an impression which might also be given to observers of such flocks in the field.

The relatively high frequency of flocks need not be surprising. Aaron M. Bagg (1967) has shown how a combination of weather factors may have caused two great flights of the Lapwing *(Vanellus vanellus)* from Europe to North America. Similar factors could presumably cause the much smaller displacement of small flocks of birds within North America. Such displacement of entire flocks might be particularly expected in the Knot, which is known to be highly gregarious. George H. Mackay is quoted by Bent (1927) as calling them "very gregarious", and Bent himself says they are "generally grouped in compact bunches and all moving along together; they are less likely to scatter over their feeding grounds than other waders."

The source of the Knots observed in Manitoba and the general pattern of Knot migration in western Canada cannot be determined in detail with our present knowledge. Records from this and adjacent areas, however, provide some clues.

The main migratory route of the Knot is along the eastern coast of North America (Bent, 1927; A.O.U., 1957), but it is a "tolerably common migrant throughout the Mississippi Valley east of the ninety-eighth meridian" (Cooke, 1910). At the Ontario Lakehead, the Knot has been recorded at least twice—once by Dr. A. E. Allin on May 25, 1955, and once by C. Garton on May 20, 1956 (H. Mossop, pers. comm.). Williams (1926) called it a "rare migrant" in the Red River Valley of North Dakota, but noted two fall records. In Saskatchewan, Mitchell (1924) recorded it as a hypothetical but probable spring migrant on the basis of one seen at Lake Johnstone (=Old Wives Lake) on May 13, and three on May 20, 1923. The species was substantiated for that province when Mitchell collected three of five seen at Imperial Beach, Last Mountain Lake on May

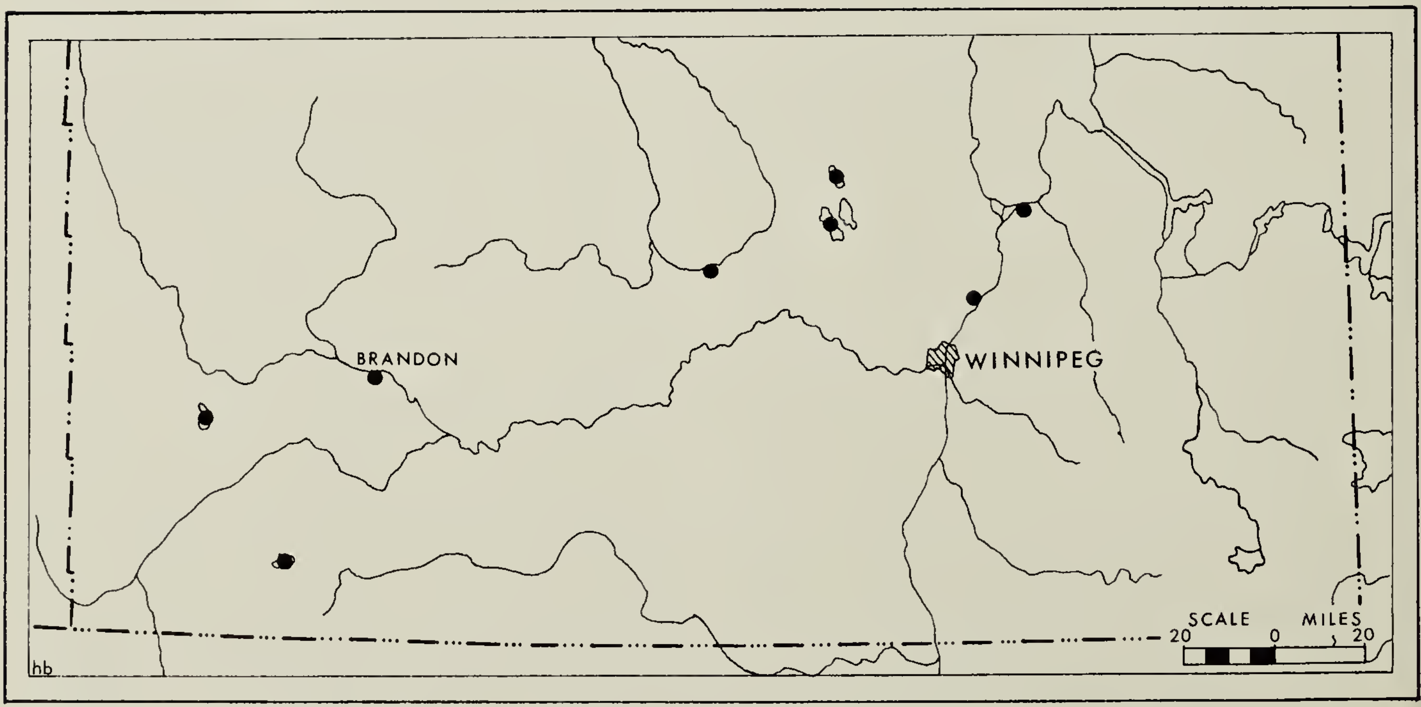

Fig. 1. Locations of Knot observations in southern Manitoba.

Table 2. Knot records from southern Saskatchewan

Date	Number	Location	Reference Source
May 13, 1923 May 20, 1923	1	Lake Johnstone (=Old Wives Lake)	Mitchell, 1924
May 24, 1931	1	Old Wives Lake	Knight, 1967
May 27, 1924	5 (3 collected)	Imperial Beach, Last Mountain Lake	Mitchell, 1925 Potter, 1943
May 24-25, 1932	2 (collected)	Imperial Beach, Last Mountain Lake	Todd, 1947
May 25, 1964	2	south end of Last Mountain Lake (formerly Valeport)	Margaret Belcher, pers. comm., 1969
May 20, 1934 May 1957 May 28, 1958 May 29-30, 1958	2 1 3 4 (plus 1 on 29th)	Regina	Belcher, 1961
May 22, 1966 May 19-21, 1967	2 1	Regina	M. Belcher, pers. comm., 1969
September 24, 1967	1	Regina	Hatch, 1968a
May 19, 1968	100	LaFleche	Hatch, 1968b
May 22, 1963	4	Rutherford's Slough, Moose Jaw	Knight, 1967
June 6, 1967 June 9, 1967	5 16	Morse	M. Belcher, pers. comm., 1969
May 21, 1959	1	Qu'Appelle Valley (Fort San)	Storer, 1959 Mossop, 1959
May 23, 1943	about 12	Melville	McKim, 1943
May 20, 1962	1	Rice Lake, Saskatoon	Gollop, Roy, and Folker, 1963
May 20, 1965	12	Porter Lake, Saskatoon	Gollop, Slimmon, and Folker, 1966
May 13, 1966 May 14, 1966	6 4	Saskatoon	Gollop, 1967
May 21, 1967	5	Saskatoon	Gollop, 1968
May 25, 1968	3	Saskatoon	Roy, 1968
May 18, 1964	1	Coteau Lake	Roy, 1968

27, 1924 (Mitchell, 1925; Potter, 1943). Since that time there have been several other records from southern Saskatchewan as summarized in Table 2. In northwestern Saskatchewan the species is given as hypothetical for Lake Athabasca on the basis of one on August 20, 1920 and three on August 21, 1920 "seen, but not definitely identified" by Francis Harper at Fair Point, Lake Athabasca (Nero, 1963). This record was recently considered to be more definite by Harper (pers. comm. to R. W. Nero, September 17, 1963) on the basis of having heard the call which he recorded as "wahquoit". In the same correspondence Harper reports collecting a Knot on August 29, 1920, 10 miles N.N.E. of Sand Point, Alberta (on Lake Athabasca). W. Rowan regarded the Knot as a regular migrant in Alberta largely on the basis of about 200 seen on May 21, 1924 and over 150 on May 23, 1924 (Bent, *op. cit.*), and Salt and Wilk (1966) regard it as a scarce but regular migrant in Alberta during both spring and fall migrations. R. S. Palmer (*in* Stoudt, 1967, pp. 239-240) records the interior flight east of the Rockies as "Alberta mainly."

Two features are noteworthy about these records. One is that all Manitoba records, with the possible exception of Braddell's Oak Lake obser-

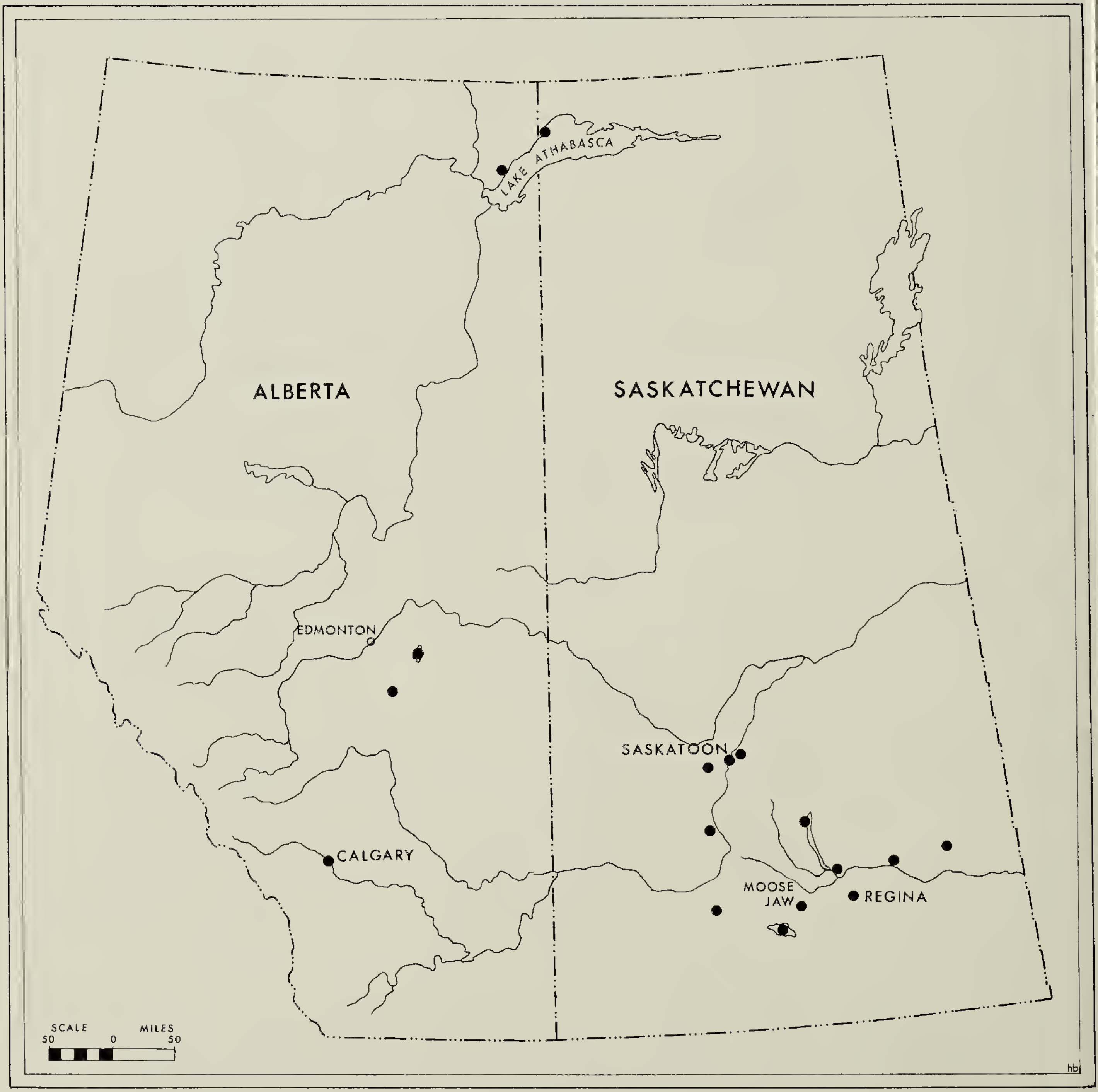

Fig. 2. Locations of Knot observations in Saskatchewan and Alberta.

vation, and all of Saskatchewan's records except the Lake Athabasca records and one of the 1967 Regina records are of spring migrants, whereas in Alberta they are considered regular in both spring *and* fall. The other feature is that there is a considerable gap in locations of observations on the prairie (as shown in figure 2). Locations given for records in Alberta by Salt and Wilk (*op. cit.*) are in the western part of the province (Beaverhill Lake, Bittern Lake, Calgary area). On the other hand, the rest of the records are from Manitoba or east and central Saskatchewan, with no records from eastern Alberta or western Saskatchewan (except Lake Athabasca far to the north). Furthermore, in Alberta they are regular at Beaverhill and Bittern lakes where they occur "sometimes in large flocks" (Salt and Wilk, *op. cit.*), whereas they do not appear to be regular in southern Manitoba or Saskatchewan, and never have been noted in flocks of the size recorded for Alberta. These factors indicate that there may be two different pathways involved, one passing through western or central Alberta, the other east of Manitoba, and occasionally through eastern Saskatchewan and Manitoba.

In examining the distribution of these records it is interesting to note the differences in water availability in different portions of the prairie provinces. In Manitoba, south and west of the Precambrian Shield lies the broad, shallow Glacial Lake Agassiz Basin, of which Hochbaum (1967, p. 197) says, "Few regions of North America are so richly endowed with standing waters." Thus the region has plenty of water available most of the time. However, many of the water bodies in this area "are very shallow and disappear in very dry seasons" (Davis *et al.*, 1926, p. 8). Since there has been essentially no change in topography since the latest glaciation (Davies *et al. op. cit.*, pp. 149-160), this area has had plenty of water available for migrant waders for centuries, but this availability varies from one year to another and is more reliable in spring than in fall. Similarly, southeastern and south central Saskatchewan is largely an area of "very flat plains on ancient lake bottoms" (Fraser, *et al.* 1935), and thus with plenty of water available but susceptible to wet-drought periods. Southwestern Saskatchewan and southeastern Alberta, on the other hand, are largely made up of arid areas and areas of higher elevation with deeper lakes lacking enough shorelines and/or mudflats to be suitable for shorebirds (Fraser *et al.*, 1935; Williams and Dyer, 1930). Farther west in Alberta there are lakes, such as Beaverhill Lake where the greatest number of Knots in Alberta have been observed, which are "large and shallow waters" (Bird and Bird, 1967) and thus have water and shoreline available to migrant waders in both spring and fall.

Cooke (1910), noting the absence of migrating Knots in the interior of Canada, suggests that the birds in the interior (Mississippi Valley) flight must veer away from the ninety-eighth meridian and "fly north and a little east to Hudson Bay." As it would take only enough weather disturbance to keep them going north or deflect them slightly to the west to bring them to Manitoba or Saskatchewan, it seems most probable that our birds come from the Mississippi Valley flight. Since there is only a small Knot migration along coastal British Columbia, and there are no records for interior B.C. (Godfrey, *op. cit.*), it seems likely that the Alberta birds may represent a smaller contingent of the Mississippi Valley flight that veers west somewhat south of us, and proceeds along the eastern edge of the mountains, using this route to a lesser extent in the fall also. That this is possible is further borne out by the fact that although the main flight is farther east in the fall, there are several fall records from interior states (Bent, 1927).

Both the A.O.U. Check-list (1957) and Godfrey (1966) note that the fall migration is farther east than that of the spring. These conclusions appear to agree with the Manitoba-Saskatchewan records, where the interior (Mississippi Valley) route appears to be used only in the spring. The Alberta birds, in contrast, stage regular flights in both seasons, although the fall flight appears to be smaller (Salt and Wilk, *op. cit.*). These records suggest, therefore, that the tendency for Knots to avoid the interior route in the fall applies primarily to the more eastern portion, including the Manitoba and eastern Saskatchewan birds, but to a lesser extent, if at all, to birds passing through Alberta. As noted above, this may be related to water availability.

Certainly our knowledge of the migratory pathways used by the Knot is at present scanty, and more information is needed before we can accurately map its "normal" and abnormal course. For the present, the status of the Knot in Manitoba appears to be: regular spring transient along Hudson Bay, and casual spring migrant in the south.

Acknowledgments

I would like to thank W. Harvey Beck for preparing the accompanying maps for this note; Miss Margaret Belcher, David R. M. Hatch, Harold Mossop, and Dr. Robert W. Nero for information on some of the records; Dr. Roger M. Evans and Dr. Robert W. Nero for critically reading the manuscript; and particularly Herbert W. R. Copland for his work in locating the A. G. Lawrence references to the Knot. My work at the field station was financed by a National Research Council of Canada grant.

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FURTHER RECORDS OF THE VARIED THRUSH AT ROSETOWN, SASKATCHEWAN

by **Wayne Renaud,** Rosetown

In the September 1968 *Blue Jay* (26:122-3) I reported seeing a Varied Thrush *(Ixoreus naevius)* at Roseown on October 9 and 10, 1967. Since hen, we have had two records for his area which I should like to report.

On May 6, 1968 a Varied Thrush was positively identified at Valley Centre (18 miles north and seven miles east of Rosetown) by Mrs. H. Renaud when it came within yards f the picture window.

On September 22, 1968 another ndividual was sighted and photographed at the same location. Because t was evidently suffering from a wing injury it was unusually tame. It was observed from about 4:00 to 4:30 p.m. when it remained in the same group of trees; then it flew off and was not seen again until 6:00 p.m. when it was sighted in the neighbour's trees. It was apparently beoming very weak because it was lushed from the ground twice and nly flew a few yards before alighting once more. Attempts to capture t proved fruitless.

On the morning of September 23 it was caught by a cat, but the wings, ail and parts of the back and breast were salvaged, and I sent these to the Editor of the *Blue Jay*, establishing positively the occurrence of the bird in the Rosetown area.

These sightings indicate that the Varied Thrush may not be as rare in Saskatchewan as once thought.

[**Editor's Note:** It is also of interest that the Varied Thrush reappeared in Regina in the fall of 1968. A single bird of this species was seen at the McKay's bird bath on Angus Street, near the Legislative Buildings, on October 9, 1968. It was observed on that date by Mr. and Mrs. J. F. McKay, who showed it the following day to Dr. George Ledingham and myself. A second observation of a Varied Thrush in a different location was made on November 9 by Ken Johnson at 1522 Athol Street, who called Frank Brazier to confirm his identification. Then on November 14, a Varied Thrush appeared on the east side of the city, on Winnipeg Street, where it was first reported by Mrs. Dorothy Tegart. It was seen again in the backyard on a number of occasions up to November 28, by Mrs. Tegart and myself. It was never established whether it was the same individual that was observed in the three different locations.—Margaret Belcher.]

CLARK'S NUTCRACKER AT MOOSE JAW

by **D. S. Green,** 346 Acadia Drive, Saskatoon

On March 24, 1968, while driving through River Park, south of Moose Jaw, with M. E. Hacking, I saw a Clark's Nutcracker *(Nucifraga columbiana)* just south of Blackfoot Bridge, near the former Walter Riome property. I am familiar with this bird from Banff and Jasper National Parks and Mr. Hacking has had several years with the Alberta and British Columbia Forestry Services and also knows the "camp robber" well. The nutcracker was scavenging for food in an area much used for picnics.

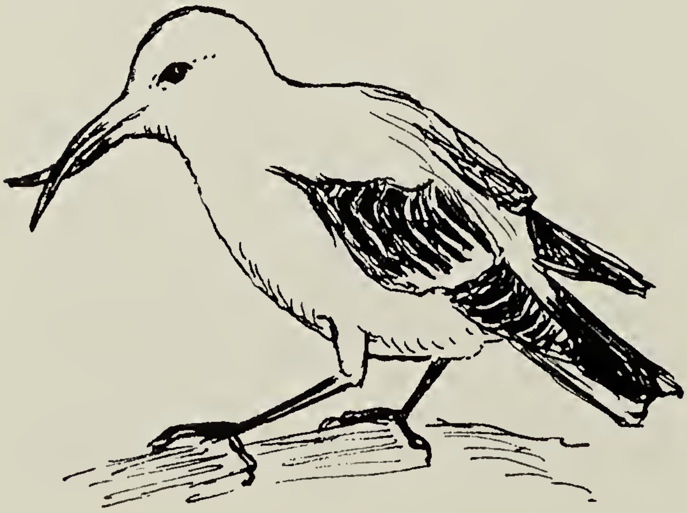
I reported the sighting at the time to F. G. Bard, Director of the Saskatchewan Museum of Natural History, who told me that only four previous sightings had been reported for the province.

[**Editor's Note:** The last observation of a Clark's Nutcracker in Saskatchewan previous to Mr. Green's record at Moose Jaw was a sighting by Fred Bard on October 8, 1963, reported to the *Blue Jay* (22:4). At that time three other records were known (a specimen collected at Ravenscrag, September 19, 1919 by Spencer Pearse, who noted several on his ranch that year; one seen in September, 1925 by Pearse; and one reported at Ravenscrag on August 18, 1960 by Robert Folker). These three records, and Mr. Bard's 1963 observation, were all from the Cypress Hills area of Saskatchewan, so the new record from Moose Jaw represents an extension of the straggler's range.]

BILL DEFORMITY IN CLARK'S NUTCRACKER

by **D. S. Green,** 346 Acadia Drive, Saskatoon

During our summer vacation in early July, 1968 we made an interesting observation at "Camp" Edith Cavell in Jasper National Park concerning Clark's Nutcracker. A great many birds of this species are to be seen in this area and one which we observed had a most unusual deformity — the bill being severely twisted and about half again as long as usual (see sketch). Nevertheless the bird seemed well-fed and active, although in part this might be attributed to the "easy living" provided by tourists in the form of nuts, crumbs, etc.



Several possible causes of this deformity have been suggested to me. Deformed bills are often thought to result from genetic change or an error in development. Injury at an early age or dietary deficiency or imbalance might be responsible for the abnormal development.

CO-OPERATIVE SPRING MIGRATION STUDY

Records are again requested for the continent-wide survey being made under the auspices of the U.S. Fish and Wildlife Service. For a list of species studied, see *Blue Jay*, September 1968, Vol. 26, #3, pp. 132-3. All records should be submitted by June 15, 1969 to:

Mrs. Mary Houston,
863 University Drive,
Saskatoon, Sask.

TURKEY VULTURE BREEDING RECORDS IN SASKATCHEWAN

by **C. Stuart Houston,** 863 University Drive, Saskatoon

My own Turkey Vulture quest has drawn a blank for 26 consecutive years — I have yet to see my first nest and have yet to band a vulture. I believe the only vulture banded in Saskatchewan was one captured at Prud'homme and brought to A. McPherson in Saskatoon on August 10, 1951 (McPherson, 1952).

Other nest seekers have been more successful, with at least 12 nests on record for the province, a good number for a relatively uncommon though widely distributed species. It seems worthwhile to place them on record, since several fill in the question mark over central Saskatchewan in Godrey's range map in *Birds of Canada* (1966).

1. Rush Lake, 1893. Two eggs on ground, found by Walter Raine in May. Raine noted this species daily at Rush Lake in 1891 but did not find a nest that year. His Indian guide, John, told him that Turkey Vultures had been more numerous in his boyhood when buffalo were plentiful on the prairie. After a buffalo had been killed and the refuse left, two or three vultures would appear. Before many hours had elapsed their numbers would increase to 20 or 30; here they would fight over the carcass, and eat to such excess and become so crammed that they were unable to fly. (Raine, 1892 and Macoun, 1909).

2. Old Wives Creek, 1895. Found breeding in May by John Macoun near Home's Ranch at the mouth of the creek (presumably Wood River at the western extremity of Old Wives Lake). (Macoun, 1909).

3. Moose Jaw, 1897. A set of two eggs taken near Moose Jaw, May 12, 1897 was in the Walter Raine collection (Macoun, 1909).

4. Quill Lake, 1914. Nest with two young birds under a large rock on the edge of the lake. H. C. Grose says "I am positive from the description that this is correct." (Grose, 1917).

5. Old Man on His Back Plateau, 1915. Two downy young with pin-feathers on ground in a thick clump of saskatoon bushes at the head of a small narrow side-coulee, protected by a steep bank on the west side. Found by R. D. Symons when on a branding roundup on south side of plateau—about 14 miles south and somewhat east of the present site of Robsart.

6. Beaver River, 1920. Nest with one young among deadfall logs on a jackpine sand ridge north of river near Barnes Crossing. It was found by Leland Bradford and described to R. D. Symons the following winter.

7. Murray Lake, 1933. Nest with two downy young in a slight hollow on top of the bank on an island at the east end of the lake. It was among several large round rocks with snowberry growing between and some saskatoon and poplar to the three sides not facing the lake. (Symons, 1967).

8. Touchwood Hills, about 1934. Nest with two young under a fallen log in thick growth of trees on island in lake about 14 miles north of Punnichy. (McKim, 1944 and 1945).

9. Madge Lake, 1942. An adult came out of a hollow log on the forest floor on an island in the lake. F. J. Hartley Fredeen, involved in limnological research at the time, presumed it was nesting but did not disturb it further.

Photo by Lee and Lewis Morrison

Young Turkey Vultures in cave, July, 1952

Photo by Lee and Lewis Morrison, Robsart

Conglomerate cave near Frenchman River, used as nest of Turkey Vulture, July 1952.

10. Frenchman River, 1952. Nest with two young in a large cave of conglomerate rock on the west side of "Woody Coulee", at the extreme southeast corner of section 28, township 6, range 24, about four miles west of Ravenscrag. It was found in late July, perhaps July 23, by Lewis and Lee Morrison. They have kindly allowed their photographs to illustrate this article.

11. Moose Mountain Park, 1959. A nest with one egg was found on June 10, 1959, by a Museum party, including Fred Lahrman and Richard Fyfe who reported it to the Prairie Nest Records Scheme. It was on rotten wood under heavy brush on an island in Jabe Lake, where Great Blue Herons were nesting in the trees.

12. Near Big Beaver, 1965. Nest with two young in cave about three feet above the ground, seven miles south and seven miles east of Big Beaver and less than a mile north of the United States boundary. The large cave was 12 feet wide, 16 or 20 feet deep and up to five feet in height, with an entrance 4½ feet wide and 2½ feet high. The young were banded by Bernie Haysom on July 3, 1965.

H. H. Mitchell evidently knew of a bona fide breeding record since he noted this species as "found breeding in Qu'Appelle Valley" with no further details given. Possible nesting records for the South Saskatchewan River include a young bird found in the hills near Demaine in September 1961 which may have been raised in the area as its wing appeared to have been injured when still a fledgling (Santy, 1962). Richard Fyfe observed a pair along Swift Current Creek just south of the river on May 23 and June 21, 1968, with an adult flying from a large hole in the cliff on the first occasion.

Other sightings of this species throughout the nesting season are known from many localities in the province, chiefly the sparsely settled areas. Only a few of these that illustrate their declining numbers will be mentioned here. George H. Lang of Indian Head reported to the U.S. Biological Survey that he had seen only one in 1904, on June 20, and one in 1913, on April 28, whereas formerly they had been very common and bred locally. Laurence B. Potter of Eastend reported in 1930 that the Turkey Vulture, once plentiful in that area, became uncommon as grain farming largely displaced cattle ranching. They ceased to be regular residents at Good Spirit Lake northwest of Yorkton in 1896, but persisted in good numbers at Round and Crooked Lakes in the Qu'Appelle Valley until the early 1940's and as many as 30 could be seen soaring over Madge Lake as late as 1945 (Houston, 1949).

I wish to thank the many people mentioned whose observations have made the above report possible. My gratitude would know no bounds if someone could find another nest this year and phone me collect at Saskatoon 244-0742.

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BROWN THRASHER AT ISLAND LAKE, MANITOBA

by **A. E. Wilson**, Island Lake

A Brown Thrasher found by 12-ear-old Norman Wood is a new pecies record for Island Lake, Maniba. The bird was found almost dead rom cold under a boat on November 1, 1968. The bird undoubtedly was straggler and not a local resident, r its breeding range lies far to the uth. Godfrey (1966. *The birds of anada*) gives Dauphin as a northern reeding locality in Manitoba. Incientally, this is a species unfamiliar the boy's father who is a life-long esident of Island Lake.

R. W. Nero informs me that J. R. ehl, Jr. and Mrs. I Smith list the rown Thrasher in their coming reised account of the birds of Churchill icinity, far to the north of Island ake. Its occurrence at both places ust be regarded as accidental.

The date of its occurrence is late r this species in any case. Bent 1948. *Life histories of North Amerin nuthatches, wrens, thrashers and eir allies*) mentions dates in Sepmber and early October as late eparture dates for Canadian localies; November 13 is the latest date iven for Washington, D.C. The pecimen will be given to the Maniba Museum of Man & Nature in innipeg.

Editor's Note: Because late fall eparture dates are unusual for the rown Thrasher, it is worth menioning here that Al and Betty Binnie ecorded a Brown Trasher seen at egina as late as December 21, 1968.]

OWL AND HAWK NESTS

Anyone finding an active nest of any bird of prey in Saskatchewan, is asked to contact Dr. Stuart Houston, 863 University Drive, Saskatoon, who will notify the nearest bander. Nests within 50 miles of Saskatoon, Regina, Indian Head or Yorkton will be visited and the young banded; nests at a greater distance may be visited, including most of those within 100 miles of Saskatoon, depending on numbers, and time available. With the declining numbers of many birds of prey, including now the Marsh Hawk, it is important to learn all we can of nesting success and migration routes. Experience has shown that banding visits do not adversely affect nesting success, but have contributed greatly to our knowledge.

PRAIRIE NEST RECORDS SCHEME

Contributors are reminded to send 1969 nest record cards to Dr. Robert W. Nero, Prairie Nest Records Scheme, Manitoba Museum of Man and Nature, Winnipeg 2. If you have not previously contributed to the scheme but are interested in keeping records, write to Dr. Nero for information and nest record cards. Also available from him is the summary of the scheme's first 10 years operation (1958-67).

GREAT GRAY OWL CONCENTRATION

Great Gray Owls appeared unexpectedly in southeastern Manitoba in late October and early November, 1968. They have since been seen in a number of localities in an area of about 45 miles by 75 miles extent bordering the west side of the Whiteshell Provincial Park east of Winnipeg. Largest numbers have been seen near extensive stands of lowland black spruce, but they have been sighted in a variety of habitats and near habitations. As many as 13 have been counted in one day and it is believed that at least a few hundred must be involved in this unusual concentration.

In order to document the arrival, movement, and spring departure of these birds (there being as yet no evidence of this species nesting in this part of Manitoba) persons with information are urged to contact **Dr. Robert W. Nero, Manitoba Museum of Man & Nature, 147 James Avenue, Winnipeg 2, Manitoba.**

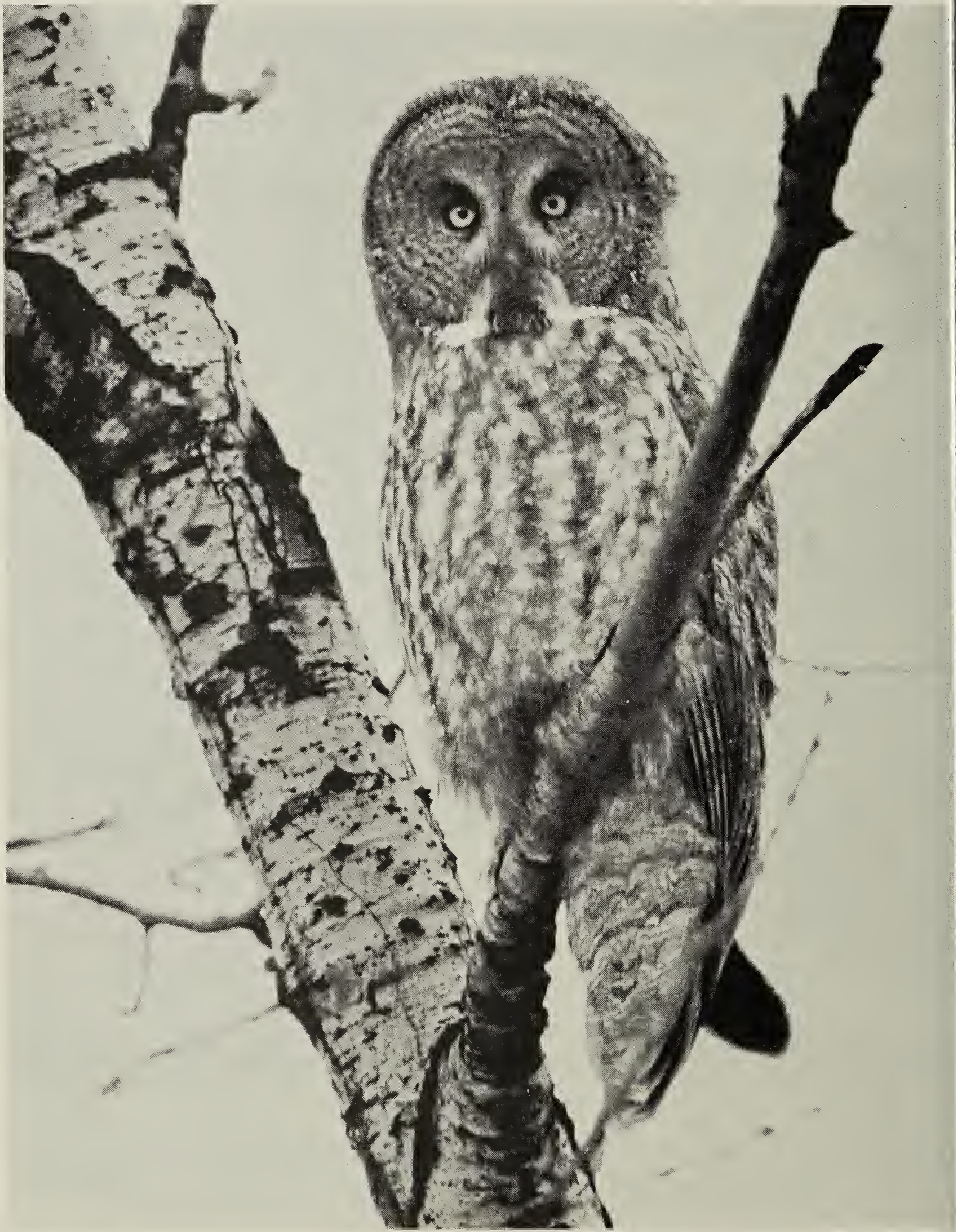


Photo by Robert R. Taylor,
Manitoba Museum of Man and Nature

Great Gray Owl, East Braintree, Manitoba, December 8, 1968

NEW SASKATCHEWAN BUTTERFLY RECORDS

by **Ronald R. Hooper,** Fort Qu'Appelle

During an insect-collecting field-rip for the Saskatchewan Museum of atural History from June 24 to 29, 968, I collected four new butterfly pecies for Saskatchewan, three of hich are new species for Canada. he collecting was done in the badands along the Frenchman River in he western part of the Wood Mounains.

The barren hilltops are a semiesert environment which is the only lace in Saskatchewan where the orned Lizard has been found. The at areas near the river contain the amous Prairie Dog colonies.

Collecting is difficult on the hilltops ecause of the almost constant breeze. he best time to collect seems to be n sunny mornings before the sun ecomes too hot or the wind too trong. The butterflies congregate on he sunny, sheltered sides of the lopes around the flowers of Yellow mbrella Plant *(Eriogonum flavum)*, *enecio*, and various Leguminosae. ollecting must be done by careful talking, for once the insect is alarmd there is little hope of following it n such rugged terrain, especially if breeze catches it. For this reason here are probably many more species ew to Saskatchewan yet to be disovered in this type of area.

The day-by-day collecting went as ollows—

ONDAY, June 24—We drove to illdeer, but found it too wet to go nto the Killdeer badlands, so we eaded toward Val Marie.

UESDAY, JUNE 25—Collected in orning in badlands northeast of Val arie, where I took Canada's first ecord of Oslar's Roadside Skipper *Amblyscirtes oslari* Skin.). One speciien was taken in this locality and ne other specimen was taken in the fternoon on a hilltop southeast of al Marie. This species has been ormerly recorded as ranging north o Nebraska.

EDNESDAY, JUNE 26—We drove to the badlands on the east side of the Frenchman River, east of Rosefield, within a mile or so of the Montana border. The day was cool and windy, and the sun did not shine until late in the afternoon when I went up on a barren hilltop, where I collected Saskatchewan's first record of Alpine (or Colorado) Blue *(Philotes battoides centralis* B. & McD.*)*. The closest former record was a specimen that I took at Elkwater, Alberta in June, 1963.

THURSDAY, JUNE 27—A beautiful day. While on the way up a juniper-covered slope, I netted a small, faded hairstreak on a *Senecio* blossom. It turned out to be a Juniper Hairstreak *(Mitoura siva* Edw.*)*. The closest previous record for this species is western North Dakota. It has not been recorded before for Canada.

Later in the morning I took a single fresh specimen of Simius Roadside Skipper *(Amblyscirtes simius* Edw.*)*. This too is Canada's first record. It has been recorded as occurring north to Nebraska.

FRIDAY, JUNE 28—I collected in the Wood Mountain Regional Park area, but came up with nothing new. This is rather to be expected, as it is on the northern slopes and therefore is not in the Missouri drainage. It seems to be typical parkland in many ways.

SATURDAY, JUNE 29—I collected in the badlands southwest of Killdeer, but the weather was very poor and not much was taken.

These specimens were identified by C. F. Dos Passos of Mendham, N.J.

I should also like to report at this time that C. F. Dos Passos has identified for me as well a specimen of Juvenal's Dusky Wing *(Erynnis juvenalis* Fab.*)* which I took among the Bur Oak in June, 1967. This is Saskatchewan's first authentic record of Juvenal's Dusky Wing. It brings the list of definitely determined Saskatchewan butterflies to 118 species.

A PRELIMINARY BOTANICAL SURVEY OF THE BIG MUDDY VALLEY IN SOUTHERN SASKATCHEWAN, 1968

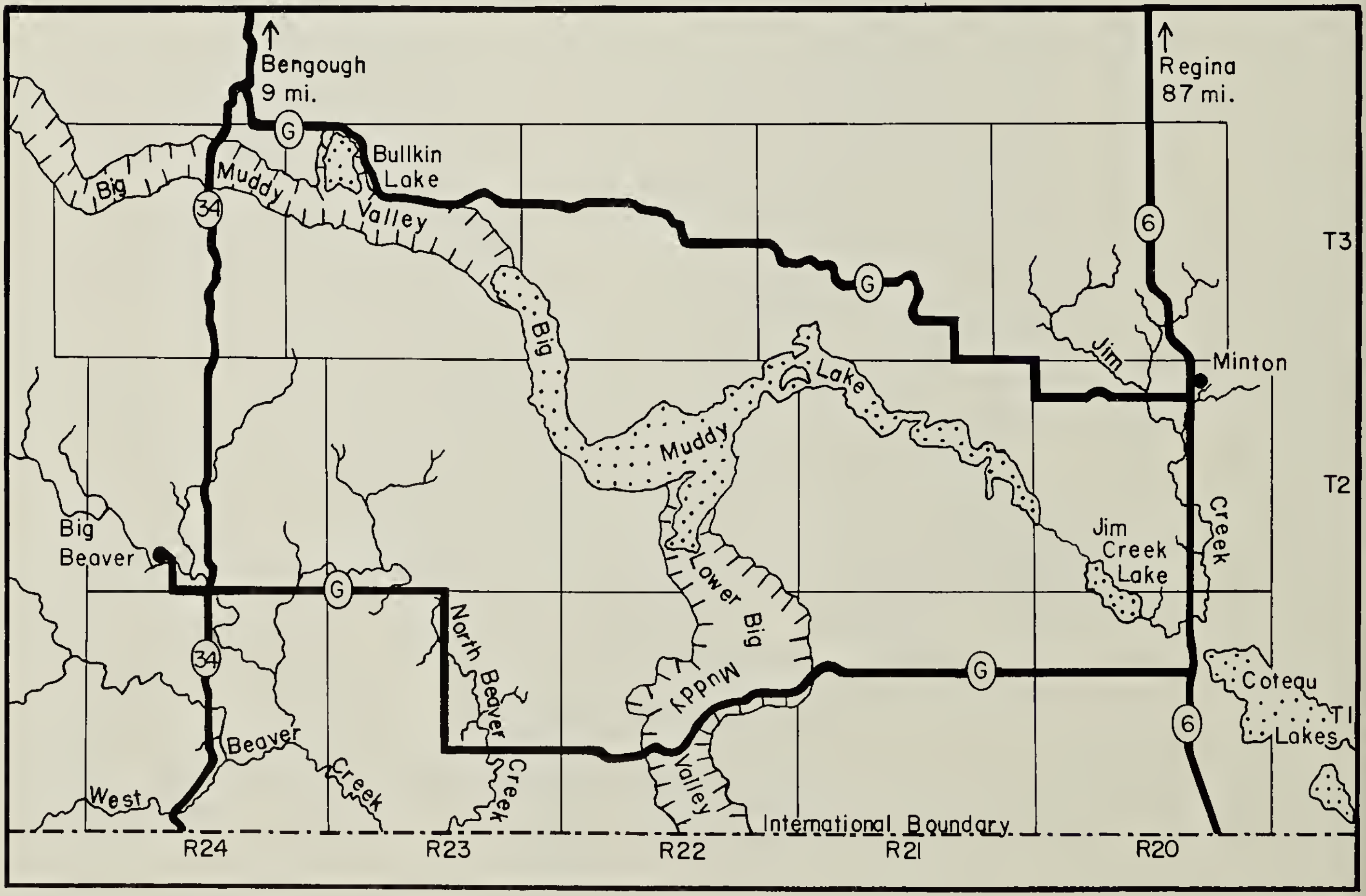
by **Helen Morrison, Regina**

Introduction

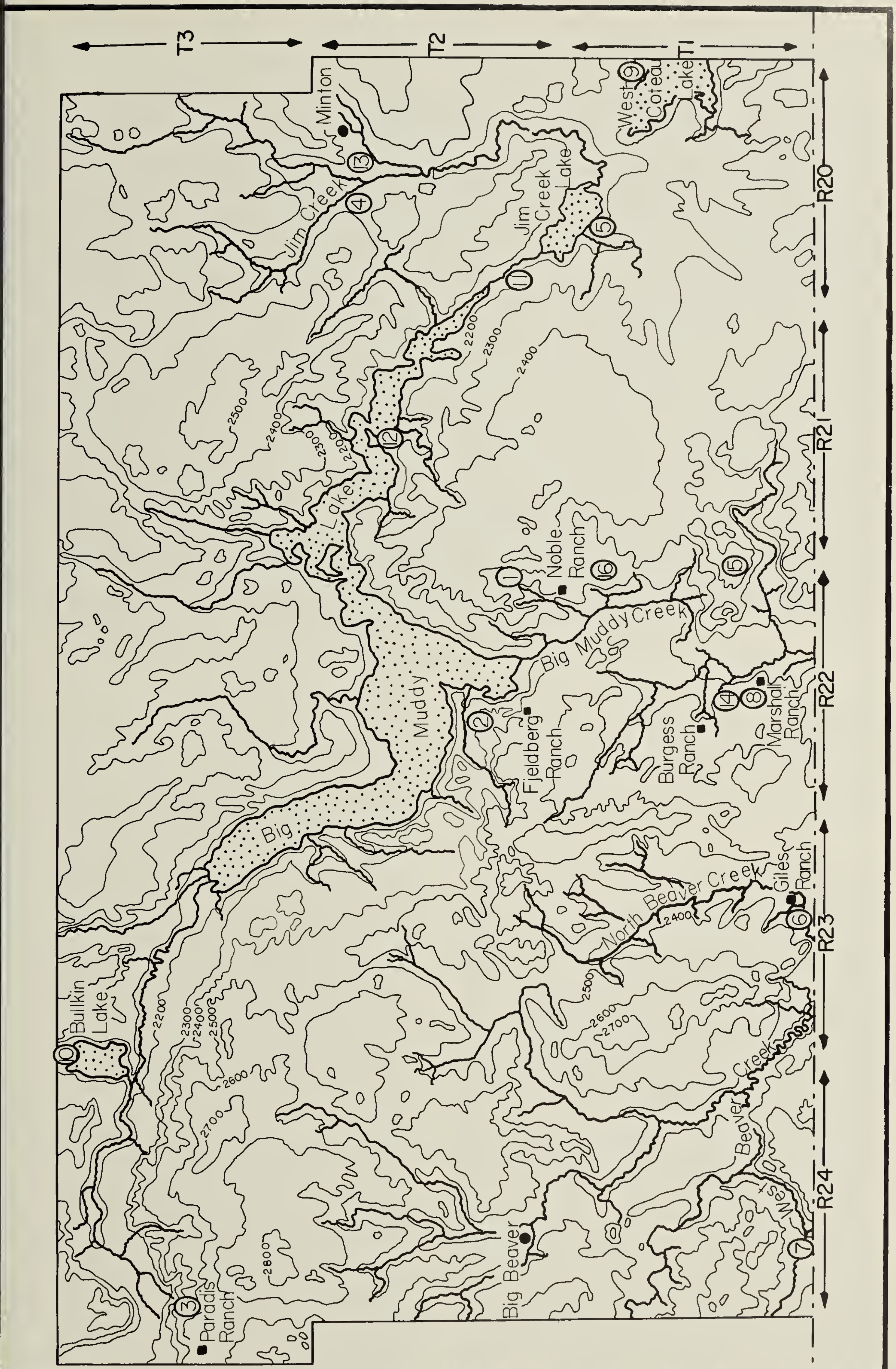
The Big Muddy Valley is located in south central Saskatchewan, approximately 100 miles south and slightly west of Regina. The valley begins south of the town of Harptree in Township 4, Range 26, West of the 2nd Meridian, where Twelve Mile Lake Valley and Lake of the Rivers Valley meet, and extends southeast to Big Muddy Lake. South from the lake, a branch of the valley, often referred to as the lower Big Muddy Valley, continues south across the International Boundary to join the Missouri Valley. With its steep walls of exposed bedrock and interesting rock outcrop formations, the Big Muddy Valley is a sharp contrast to the undulating prairie through which it cuts.

To the best of my knowledge, no intensive study of the flora of the Big Muddy Valley has previously been made. The herbarium of the Saskatchewan Museum of Natural History in Regina contains a number of specimens collected in the Big Muddy Valley by William Shevkenek (1937, 1938, and 1939). Some collections were also made in this area for the Museum by O. C. Furniss (1949), L. T. Carmichael (1949), and Dr. G. F. Ledingham (1950). The herbarium at the University of Saskatchewan, Regina Campus, has specimens collected from the Big Muddy Valley in recent years by Mr. and Mrs. D. Wade and by Dr. G. F. Ledingham.

Under the guidance of Dr. G. F. Ledingham, I chose part of the Big Muddy region as a study area (Map 1). From May to October, 1968, this study area was visited at about two-week intervals, weather permitting. Sixteen collection sites in various habitats in the area were designated



Map 1. The general location of the Big Muddy study area, its main roads and general geographical features.



ap 2. Topographical features of the Big Muddy study area and the location f the main collection sites. Contour interval is 100 feet.

and visited regularly (Map 2). Collections were made in other areas when time allowed. During this period, 336 species were collected. The list of species which follows is by no means a complete list of vascular plants for the area, but it is a preliminary list to which additions can be made in the future. As this was the first botanical work of this nature that I have attempted, there is no doubt that some species were overlooked in the field. The pattern of precipitation during the months of the study is another factor which probably influenced the number of species found. Because the months from May to July were exceptionally dry, it is possible that many perennials did not flower. The total precipitation recorded at Minton for these three months was 2.94 inches. In August and September, the recorded precipitation at Minton was 7.23 inches and 1.16 inches respectively*. It was not unusual to see early-flowering species such as the Crocus *(Anemone patens* var. *wolfgangiana)* and Three-flowered Avens *(Geum triflorum)* blooming in late September. Perhaps these plants were in a state of dormancy earlier due to insufficient moisture.

Study Area

A. Description

The area chosen for study, Townships 1-3, Ranges 20-24, West of 2nd Meridian, consists of 540 square miles including the eastern end of the main Big Muddy Valley, Big Muddy Lake, and the lower Big Muddy Valley. This area, located mainly between No. 6 and No. 34 highways, is crossed by two grid roads, one north and one south of Big Muddy Lake, making the area easily accessible by car (Map 1).

The study area lies completely within the semi-arid brown soil zone. According to Soil Map of Saskatchewan, Map 7, Soil Survey Report No. 10, the valley is characterized by badlands with eroding clay soils (Figure 1), while the surrounding uplands, fo the most part, are covered by Haver hill Association loam, rated poorly a a grain producer, with some areas o Haverhill Association clay loam. Th floor of the main Big Muddy Valle and the flat extending from the eas end of Big Muddy Lake to Wes Coteau Lake are classified as heav alkali soils. Although most sloughs i the area are alkaline, there are man fresh springs which run throughou the year.

The present drainage system in th valley had no part in the valley' formation. Creeks and runoffs lead t Big Muddy Lake from north, wes and south. In the east, Jim Creek wa dammed in 1952 to form Jim Cree Lake. West Coteau Lake is extremel alkaline, and, like Big Muddy Lake contained very little water in 196 until the heavy rains in August. Th north and west forks of Beaver Cree have their sources southwest of Bi Muddy Lake but flow south across th International Boundary to the Missouri River System. Bullkin Lake northwest of Big Muddy, also lie within the study area.

A variety of habitats were found i this region — alkaline flats, marsh creeks and springs, eroding clay badlands with rock outcrops, undulatin and rolling prairie uplands, mois wooded coulees and depressions, an disturbed areas. By designating collection localities in the different habitat and visiting them regularly, I attempted to collect as many species as possible. Sites 1 to 3 were located in th badlands, sites 4 to 8 were marsh areas near creeks and springs, sites to 13 were on extremely alkaline soils site 14 was a rock outcrop, site 1 covered various wooded derpressions and site 16 was grazed natural pasture land. Specimens from disturbe areas were collected mainly fro roadsides throughout the entire stud area.

B. Geology

The Big Muddy Valley was forme approximately 15,000 years ago du ing the retreat of the final ice shee

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* Monthly Record of Meteorological Observations in Canada, Regina Weather Office.

ig. 1. Big Coulee on the Noble ranch in the lower valley showing eroding ay slopes characteristic of the badlands.

om southern Saskatchewan. As the e retreated in a northeast direction, eltwater from the glacier front cut is channel in the bedrock and later andoned it. The valley has since quired a level floor of alluvium, cared down by runoff water in wet years. ow the valley averages 250 feet in pth, although south of Big Muddy ake, the depth reaches 500 feet Houldsworth, 1941). Slumping and eathering have made the steep slopes ore gentle until today many are rassy, but bare strata can be seen in any places along the length of the lley.

The lowest of the bedrock strata en in the part of the Big Muddy alley located in the study area is the hitemud formation, seen to the eatest extent where No. 34 highway osses the valley. Here an uplift has curred, causing a thickness of 50 et to become visible. Two miles east the west end of Big Muddy Lake, is stratum dips below the present ke level, and it is not visible in the wer Big Muddy Valley. A white d light grey sandy clay zone forms the lower part of this formation, while the upper zone is of white, grey, pale mauve, and black carbonaceous clay containing silt beds (Parizek, 1964).

The Upper Ravenscrag formation, which may be as thick as 500 feet, rests on the Whitemud formation as the Lower Ravenscrag is generally missing in this area. It contains many coal seams. The lower part of this zone, the Grey Facies, is made up of feldspathic sand, often cross-bedded, and grey, greenish-grey, and yellow sandy clay beds while the upper Buff Facies are composed of yellowish-brown fine-grained sand, silt, shale, and clay (Parizek, 1964). The exposures in the lower Big Muddy Valley also exhibit the Willowbunch clay meander.

The vast quantities of clays and sands of these formations were laid down long before glaciation by river systems which brought the material from highlands in the west, after the expulsion of the seas from western Canada.

C. Fauna

During trips in the field, I saw various faunal species. I will attempt at this time to give an account only of the vertebrate animals I observed while in the study area.

Pronghorns, generally in small groups, were a common sight in the lower Big Muddy Valley and north of Big Muddy Lake. W. Noble, whose ranch is in the lower valley, reported that large herds of Pronghorns often feed with his cattle during winters when the snow is deep. Coyotes were noted on many occasions throughout the study area. The Mule Deer is also common in this part of the province. Smaller mammals seen included Nuttall's Cottontail, White-tailed Jack Rabbit, Red Fox, Richardson's Ground Squirrel, Thirteen-lined Ground Squirrel, and the Striped Skunk. On one field trip to the area Big Brown Bats were collected from crevices in rocks on the south shore of Big Muddy Lake (by Gary Anweiler for U. of S., Regina Campus, September, 1968).

An outstanding feature of the bird population of the Big Muddy area is the numerous species of hawks found there. Those species present are the Ferruginous Hawk, Sharp-shinned Hawk, Cooper's Hawk, Marsh Hawk, Red-tailed Hawk, Swainson's Hawk, Pigeon Hawk, and Sparrow Hawk; the Prairie Falcon also nests in the valley. (Bernie Haysom, personal communication). Two Golden Eagle nests were located in the survey area.

Several kinds of snakes appear to be common in the lower valley including the Plains Garter Snake and Bull Snake. The Smooth Green Snake is present in the area also (collected by Dr. D. Secoy of U. of S., Regina Campus, September, 1968 Cf. *Blue Jay*, 26:p. 203). An Eastern Yellow-bellied Racer was killed by T. Marshall on his ranch in the lower Big Muddy in September, 1968.

D. Flora of Big Muddy Valley

The grasses found in this region are characteristic of the Mixed Prairie. Little Bluestem *(Andropogan scoparius)*, Blue Grama Grass *(Bouteloua gracilis)*, Spear Grass *(Stipa vir dula)*, and June Grass *(Koeleria cris tata)* were very plentiful. The exter sive growth in pastures of species suc as Prairie Selaginella *(Selaginell densa)*, Pasture Sage *(Artemisi frigida)*, Broomweed *(Gutierrezi sarothrae)*, Prickly Pear Cactu *(Opuntia polyacantha)*, and Cushio Cactus *(Mamillaria vivipara)* indi cated the problem of overgrazin faced by ranchers. The Lands Branc of Saskatchewan Department of Agr culture indicates that, depending o land management procedures, in thi part of the province from 20 to 3 acres of native pasture is required pe head of cattle, and, to replenish pas tures, 40% of the grasses should b allowed to go to seed annually.

The dominant grass on alkalin flats in this region was Alkali Gras *(Distichlis stricta)*. Various member of the family Chenopodiaceae wer prevalent also, including Greasewoo *(Sarcobatus vermiculatus)*, Wester Sea-blite *(Suaeda depressa)*, and Sam phire *(Salicornia rubra)*. Small-leave Everlasting *(Antennaria parvifoli* Nutt.) was common in alkaline area also.

Various species of sedges *(Care spp.)*, bulrushes *(Scirpus spp.)*, an rushes *(Juncus spp.)* were associate with creeks and springs in the Bi Muddy area (Figure 2). Seasid Arrow-grass *(Triglochin maritima* Seaside Buttercup *(Ranunculus cym balaria)*, and Salt-meadow Gras *(Puccinellia nuttalliana)* were ver abundant in these areas, and Willow *(Salix spp.)* were found occasionall around sloughs.

Vegetation cover is relatively scar in the "badlands". Many of the stee slopes were bare, while the mor gentle slopes had some cover (Figur 3). Creeping Juniper *(Juniperus hor zontalis)* and Low Juniper *(J. com munis)* formed large mats over th clay slopes, preventing further dowr ward erosion (Figure 3 and 4). Ral bit bush *(Chrysothamnus nauseosus* and Shrubby Cinquefoil *(Potentil fruticosa)* were widespread here. Ye

ig. 2. Jim Creek, one mile west of Minton, looking north from the grid road, owing thick growth of *Scirpus*, *Carex* and *Juncus*.

ig. 3. Badlands south of Big Muddy Lake (top right) showing steep non-getated slopes and less steep vegetated slopes.

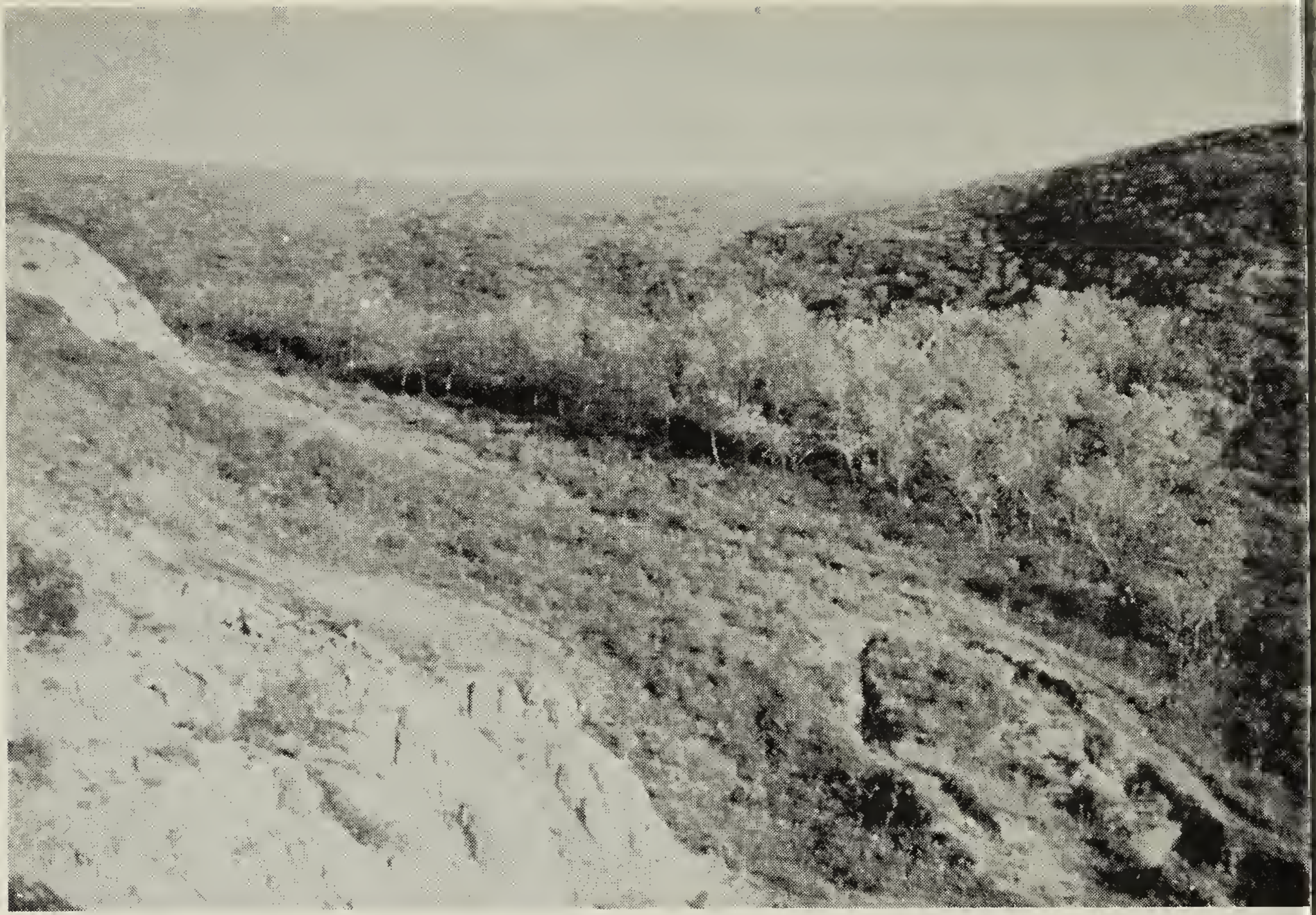

Fig. 4. Wooded depression on the northeast side of Big Coulee on the Nobl
ranch. Trees are mostly Green Ash, Manitoba Maple and American Elm.

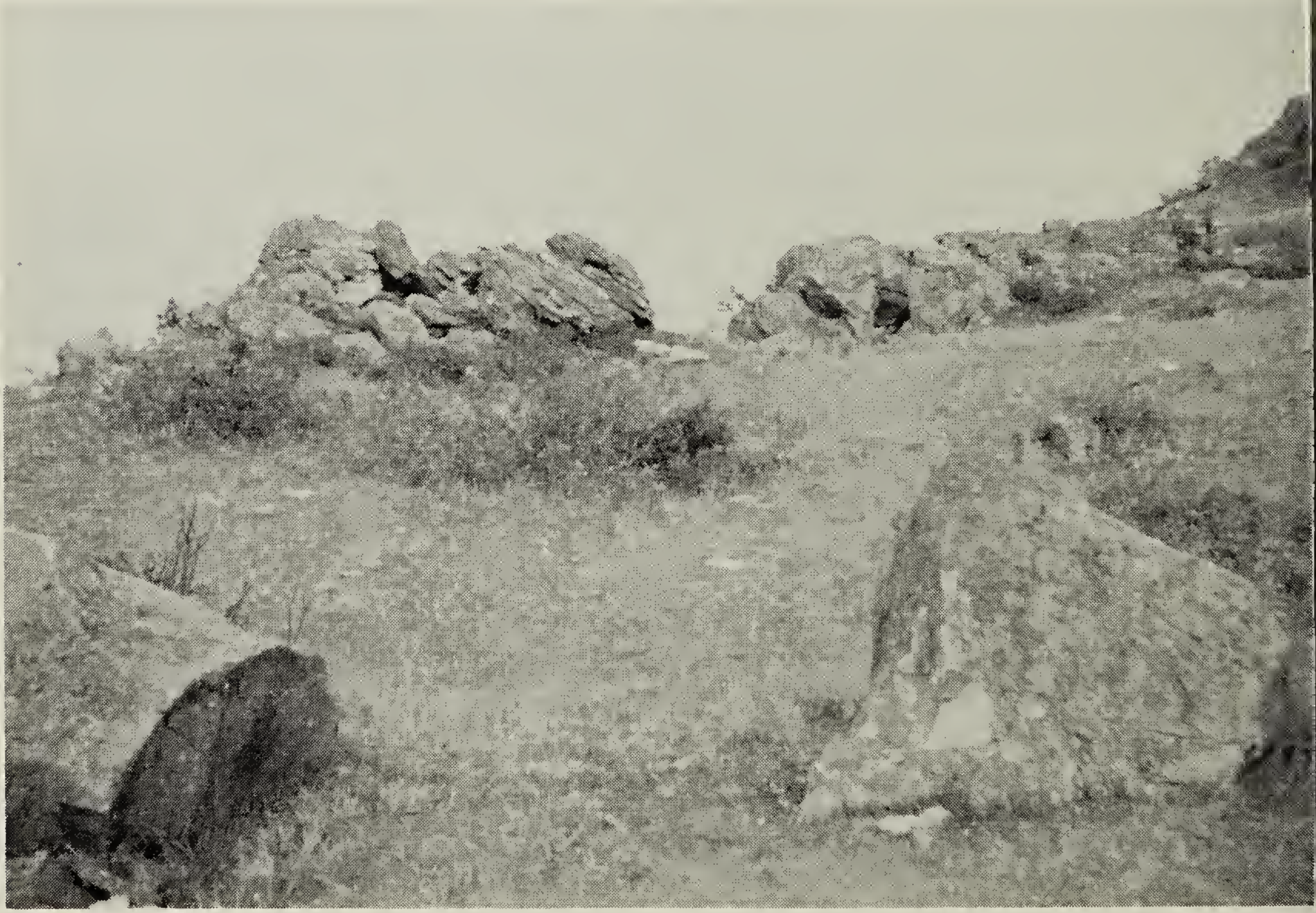

Fig. 5. Sandstone rock outcrops at Marshall ranch (site 14).

w Umbrellaplant *(Eriogonum avum)*, Branched Eriogonum *(E. ulticeps)* and Spatulate Bladderpod *esquerella alpina* var. *spathulata)* emed to prefer dry clay banks. Eve- ngstar *(Mentzelia decapetala)* was und on one occasion only.

In the "badlands", the moist depres- ons were filled with Aspen *(Populus emuloides)*, American Elm *(Ulmus nericana)*, Green Ash *(Fraxinus nnsylvanica subintegerrima)*, under hich were Saskatoon *(Amelanchier nifolia)*, Chokecherry *(Prunus vir- niana* var. *melanocarpa)*, Pin Cherry *runus pennsylvanica)*, and Wood's ose *(Rosa woodsii)*, (Figure 4). uffaloberry *(Shepherdia argentea)* as very common in coulees and roughout the "badlands".

Three species unusual for southern skatchewan were collected from ck outcrops. Purple Cliff Brake *ellaea glabella)*, reported south of e Missouri River in North Dakota Stevens (1950), at Lake Atha- sca and in the Flin Flon area by reitung (1957), and in Manitoba by oggan (1957), was collected from ndstone rock outcrops at the Mar- all Ranch in the lower Big Muddy alley (Figure 5) and near West eaver Creek. This suggests that it s moved up the northern tribu- ries of the Missouri River. It was eviously collected in the Big Muddy B. Boivin in July, 1954 (Duplicate Fraser Herbarium). Oregon Wood- a *(Woodsia oregana)* has been re- rted in the Rocky Mountains, Cy- ess Hills, Drumheller, and Lake thabasca regions of Alberta by Moss 959); Breitung (1957) reported it Cypress Hills, Denare Beach and ke Athabasca in Saskatchewan; and evens (1950) recorded it for North akota. This was also collected on the ndstone outcrop at Marshall's anch, but it was previously collected ar Bullkin Lake by B. Boivin. inear-leaved Umbrellawort *(Mira- lis linearis)* was collected in the me locality and is not commonly und north of the International oundary.

The list which follows catalogues all the species collected in the Big Muddy Valley area. The scientific names are according to Scoggan (1957). Specimens have been added to the herbarium at University of Saskatchewan, Regina Campus, and duplicates are in the Fraser Herbarium, University of Saskatchewan, Saskatoon.

SPECIES LIST

EQUISETACEAE

Equisetum arvense L., *Equisetum laevigatum* A. Br.

SELAGINELLACEAE

Selaginella densa Rydb.

POLYPODIACEAE

Cystopteris fragilis (L.) Bernh., *Pellaea glabella* Mett., *Woodsia oregana* D.C. Eat.

PINACEAE

Juniperus communis L., *Juniperus horizontalis* Moench.

TYPHACEAE

Typha latifolia L.

SPARGANIACEAE

Sparganium multipedunculatum (Morong) Rydb.

JUNCAGINACEAE

Triglochin maritima L., *Triglochin palustris* L.

ALISMATACEAE

Alisma subcordatum Raf., *Alisma triviale* Pursh, *Sagittaria cuneata* Sheldon

GRAMINEAE

FESTUCEAE

Bromus porteri (Coult.) Nash, *Bromus inermis* Leyss., *Distichlis stricta* (Torr.) Rydb., *Glyceria grandis* Wats., *Poa arida* Vasey, *Poa canbyi* (Scribn.) Piper, *Poa compressa* L., *Poa cusickii* Vasey, *Poa palustris* L., *Poa pratensis* L., *Poa secunda* Presl, *Puccinellia nuttalliana* (Schult.) Hitchc.

HORDEAE

Agropyron cristatum (L.) Gaertn., *Agropyron repens* (L.) Beauv., *Agropyron smithii* Rydb., *Agropyron spicatum* (Pursh) Scribn. & Smith, *Agropyron trachycaulum* (Link) Malte, *Agropyron trachycaulum* (Link) Malte var. *glaucum* (P. & M.) Malte, *Agropyron trachycaulum* (Link) Malte var. *novae-angliae* (Scribn.) Fern., *Agro-*

pyron trachycaulum (Link) Malte var. *unilaterale* (Cassidy) Malte, *Elymus canadensis* L., *Elymus virginicus* L., *Hordeum jubatum* L., *Hordeum jubatum* L. var. *caespitosum* (Scribn.) Hitchc.

AVENEAE

Avena fatua L., *Koeleria cristata* (L.) Pers.

AGROSTIDEAE

Agrostis scabra Willd., *Calamagrostis inexpansa* A. Gray, *Calamagrostis montanensis* Scribn., *Calamovilfa longifolia* (Hook.) Scribn., *Muhlenbergia cuspidata* (Nutt.) Rydb., *Muhlenbergia racemosa* (Michx.) BSP., *Stipa comata* Trin. & Rupr., *Stipa viridula* Trin.

CHLORIDEAE

Beckmannia syzigachne (Steud.) Fern., *Bouteloua gracilis* (HBK.) Lag,. *Spartina gracilis* Trin.

ANDROPOGONEAE

Andropogon scoparius Michx.

PANICEAE

Echinochloa pungens (Poir.) Rydb. var *wiegandii* Fassett, *Setaria viridis* (L.) Beauv.

CYPERACEAE

Carex atherodes Spreng., *Carex backii* Boott, *Carex brevior* (Dew.) Mack., *Carex stenophylla* Wahl. var. *enervis* (Mey.) Kukenth., *Carex filifolia* Nutt., *Carex lanuginosa* Michx., *Carex parryana* Dew., *Carex praegracilis* Boott, *Carex rossii* Boott, *Carex sprengelii* Dew., *Carex xerantica* Bailey, *Eleocharis palustris* (L.) R. & S., *Scirpus acutus* Muhl., *Scirpus americanus* Pers., *Scirpus nevadensis* Wats., *Scirpus paludosus* Nels., *Scirpus validus* Vahl.

LEMNACEAE

Lemna minor L. (no specimen taken)

JUNCACEAE

Juncus balticus Willd. var. *littoralis* Engelm., *Juncus bufonius* L.

LILIACEAE

Allium textile Nels. & Macbr., *Disporum trachycarpum* (Wats.) B.&H., *Lilium philadelphicum* L. var. *andinum* (Nutt.) Ker, *Smilacina stellata* (L.) Desf., *Smilax herbacea* L. var *lasioneura* (Hook.) A. DC., *Zigadenus gramineus* Rydb.

SALICACEAE

Populus deltoides Marsh. var. *occidentalis* Rydb., x *Populus dutilly* Lepage = *P. balsamifera* x *P. tremuloides*, *Populus tremuloides* Michx., *Salix amygdaloides* Anderss., *Salix bebbiana* Sarg., *Salix interior* Rowlee, *Salix petiolaris* Smith.

ULMACEAE

Ulmus americana L.

CANNABINACEAE

Humulus lupulus L.

URTICACEAE

Parietaria pensylvanica Muhl. *Urtica dioica* L. var. *procera* Wedd. (no specimen taken).

SANTALACEAE

Comandra pallida A. DC.

POLYGONACEAE

Eriogonum flavum Nutt., *Eriogonum multiceps* Nees, *Polygonum aviculare* L., *Polygonum coccineum* Muhl., *Polygonum convolvulus* L., *Polygonum lapathifolium* L. var. *salicifolium* Sibth., *Polygonum ramosissimum* Michx., *Rumex fennicus* Murb., *Rumex maritimus* L. var. *fueginus* (Phil.) Dusen., *Rumex mexicanus* Meisn. *Rumex occidentalis* Wats.

CHENOPODIACEAE

Atriplex argentea Nutt., *Atriplex nuttallii* Wats., *Atriplex patula* L. *Atriplex patula* L. var. *hastata* (L.) Gray, *Axyris amaranthoides* L., *Chenopodium album* L., *Chenopodium fremontii* Wats., *Chenopodium hybridum* L. var. *gigantospermum* (Aellen) Rouleau, *Chenopodium leptophyllum* Nutt. *Chenopodium strictum* Roth, *Endolepis suckleyi* Torr., *Eurotia lanata* (Pursh) Moq., *Kochia scoparia* (L.) Schrad. *Salicornia rubra* Nels., *Salsola kali* L var. *tenuifolia* Tausch, *Sarcobatus vermiculatus* (Hook.) Torr., *Suaeda depressa* (Pursh) Wats.

AMARANTHACEAE

Amaranthus retroflexus L.

NYCTAGINACEAE

Mirabilis linearis (Pursh) Heimerl.

CARYOPHYLLACEAE

Cerastium arvense L., *Gypsophila aniculata* L., *Spergularia marina* L.) Griseb. var. *leiosperma* (Kindb.) urke, *Stellaria crassifolia* Ehrh., *tellaria longipes* Goldie.

RANUNCULACEAE

Anemone canadensis L., *Anemone atens* L. var. *wolfgangiana* (Bess.) och, *Clematis ligusticifolia* Nutt., *anunculus cymbalaria* Pursh, *Ranu-ulus glaberrimus* Hook. var. *ellipticus* reene, *Ranunculus macounii* Britt., *anunculus sceleratus* L., *Ranunculus rcinatus* Sibth. var. *subrigidus* Drew) Benson.

PAPAVERACEAE

Corydalis aurea Willd.

CAPPARIDACEAE

Cleome serrulata Pursh.

CRUCIFERAE

Arabis divaricarpa, Nels., *Arabis lboellii* Hornem. var. *retrofracta* Graham) Rydb., *Armoracia lapathi-lia* Gilib., *Brassica* kaber (DC) L. . Wheeler, *Capsella bursa-pastoris* L.) Medic., *Conringia orientalis* (L.) umort., *Descurainia pinnata* (Walt.) ritt. var. *brachycarpa* (Richards.) ern., *Descurainia richardsonii* Sweet) O. E. Schulz, *Descurainia phia* (L.) Webb, *Draba memorosa* ., *Erysimum asperum* (Nutt.) DC., *rysimum cheiranthoides* L., *Erysium conspicuum* (Wats.) MacM., *Hes-ris matronalis* L., *Lepidium densi-orum* Schrad., *Lesquerella alpina* Nutt.) Wats. var. *spathulata* (Rydb.) ayson, *Lesquerella ludoviciana* Nutt.) Wats., *Sisymbrium altissi-um L.*, *Thlaspi arvense* L.

SAXIFRAGACEAE

Ribes americanum Mill., *Ribes ureum* Pursh, *Ribes oxyacanthoides*

ROSACEAE

Amelanchier alnifolia Nutt., *Cha-aerhodos erecta* (L.) Bunge ssp. *ttallii* (Pickering) Hult., *Crataegus rotundifolia* Moench, *Geum aleppicum* Jacq. var. *strictum* (Ait.) Fern, *Geum triflorum* Pursh, *Potentilla anserina* L., *Potentilla arguta* Pursh, *Potentilla concinna* Richardson, *Potentilla fruiticosa* L., *Potentilla gracilis* Dougl., *Potentilla pensylvanica* L., *Potentilla pensylvanica* var. *bipinnatifida* (Dougl.) T. & G., *Potentilla plattensis* Nutt., *Prunus pensylvanica* L.f., *Prunus virginiana* L. var. *melanocarpa* (Nels.) Sarg., *Rosa arkansana* Porter, *Rosa woodsii* Lindl.

LEGUMINOSAE

Astragalus bisulcatus (Hook.) Gray, *Astragalus canadensis* L., *Astragalus flexuosus* Dougl., *Astragalus goniatus* Nutt., *Astragalus pectinatus* Dougl., *Astragalus striatus* Nutt., *Astragalus tenellus* Pursh, *Astragalus triphyllus* Pursh, *Caragana arborescens* Lam., *Glycyrrhiza lepidota* (Nutt.) Pursh, *Lotus purshianus* (Benth.) Clements & Clements, *Medicago falcata* L., *Medicago sativa* L., *Melilotus alba* Desr., *Melilotus officinalis* (L.) Lam., *Oxytropis sericea* Nutt. var. *spicata* (Hook.) Barneby, *Petalostemum candidum* (Willd.) Michx., *Petalostemum purpureum* (Vent.) Rydb., *Psoralea argophylla* Pursh, *Psoralea esculenta* Pursh, *Thermopsis rhombifolia* (Nutt.) Richards., *Vicia americana* var. *angustifolia* Nees.

LINACEAE

Linum lewisii Pursh, *Linum rigidum* Pursh.

POLYGALACEAE

Polygala alba Nutt.

EUPHORBIACEAE

Euphorbia glyptosperma Engelm.

ANACARDIACEAE

Rhus radicans L. var. *rydbergii* (Small) Rehd. (no specimen taken), *Rhus trilobata* Nutt.

ACERACEAE

Accr negundo L.

MALVACEAE

Sphaeralcea coccinea (Pursh) Rydb.

VIOLACEAE

Viola adunca Sm., *Viola nuttallii* Pursh, *Viola rugulosa* Greene.

LOASACEAE

Mentzelia decapetala (Pursh) Urban & Gilg.

CACTACEAE

Mamillaria vivipara (Nutt.) Haw., *Opuntia fragilis* (Nutt.) Haw., *Opuntia polyacantha* Haw.

ELAEAGNACEAE

Elaeagnus commutata Bernh., *Shepherdia argentea* Nutt., *Shepherdia canadensis* (L.) Nutt.

ONAGRACEAE

Epilobium glandulosum Lehm., *Epilobium leptophyllum* Raf., *Gaura coccinea* Pursh, *Oenothera biennis* L. var. *canescens* Torr. & Gray, *Oenothera caespitosa* Nutt.

HALORAGACEAE

Myriophyllum exalbescens Fern.

HIPPURIDACEAE

Hippuris vulgaris L.

UMBELLIFERAE

Cicuta douglasii (DC.) Coult. & Rose, *Lomatium foeniculaceum* (Nutt.) Coult. & Rose, *Musineon divaricatum* (Pursh) Nutt., *Sanicula marilandica* L., *Sium suave* Walt., *Zizia aptera* (Gray) Fern.

CORNACEAE

Cornus stolonifera Michx.

PYROLACEAE

Pyrola secunda L.

PRIMULACEAE

Androsace occidentalis Pursh, *Androsace septentrionalis* L., *Dodecatheon radicatum* Greene, *Steironema ciliatum* (L.) Raf.

OLEACEAE

Fraxinus pennsylvanica Marsh. var. *subintegerrima* (Vahl) Fern.

GENTIANACEAE

Gentiana affinis Griseb., *Gentiana amarella* L.

ASCLEPIADACEAE

Asclepias speciosa Torr.

CONVOLVULACEAE

Convolvulus arvensis L.

POLEMONIACEAE

Collomia linearis Nutt., *Phlox alyssifolia* Greene, *Phlox hoodii* Richards.

BORAGINACEAE

Cryptantha bradburiana Pays
Hackelia americana (Gray) Fer
Heliotropium curassavicum L. v
obovatum DC., *Lappula echinata* Gili
Lappula redowskii (Hornem.) Gree
var. *occidentalis* (Wats.) Rydb., *Lit*
spermum incisum Lehm., *Merten*
lanceolata (Pursh) DC.

LABIATAE

Agastache foeniculum (Purs
Ktze., *Lycopus asper* Greene, *Ment*
arvensis L. var. *villosa* (Bent
Stewart, *Monarda fistulosa* L., *S*
chys palustris L. var. *pilosa* (Nut
Fern.

SOLANACEAE

Solanum triflorum Nutt.

SCROPHULARIACEAE

Castilleja sessiliflora Pursh, *Ort*
carpus luteus Nutt., *Penstemon al*
dus Nutt., *Penstemon nitidus* Doug

PLANTAGINACEAE

Plantago elongata Pursh, *Planta*
eriopoda Torr., *Plantago major*
Plantago purshii R. & S.

RUBIACEAE

Galium septentrionale R. & S.

CAPRIFOLIACEAE

Symphoricarpos albus (L.) Bla
Symphoricarpos occidentalis Hook.

CAMPANULACEAE

Campanula rotundifolia L.

COMPOSITAE

Achillea lanulosa Nutt., *Agose*
cuspidata (Pursh) Raf., *Agose*
glauca (Nutt.) Greene, *Ambrosia ar*
misiifolia L. var. *elatior* (L.) Descou
tils, *Antennaria aprica* Greene, *Ante*
naria neglecta Greene, *Antenna*
parvifolia Nutt., *Arctium min*
(Hill) Bernh., *Artemisia cana* Purs
Artemisia caudata Michx. var. *calve*
Lunell, *Artemisia frigida* Willd., *Art*
misia glauca Pall., *Artemisia lon*
folia Nutt., *Artemisia ludovicia*
Nutt. var. *gnaphalodes* (Nutt.) T.
G., *Aster brachyactis* Blake, *Ast*
canescens Pursh, *Aster chilensis* Ne
ssp. *adscendens* (Lindl.) Cronq., *Ast*

lcatus Lindl., *Aster hesperius* Gray,
ster laevis L. var. *geyeri* Gray, *Aster*
nsus (Blake) Cronq., *Aster pauci-*
orus Nutt., *Bidens cernua* L., *Chry-*
psis villosa (Pursh) Nutt., *Chryso-*
amnus nauseosus (Pall.) Britt., *Cir-*
um arvense (L.) Scop., *Cirsium*
odmanii (Rydb.) Arthur, *Cirsium*
ndulatum (Nutt.) Spreng., *Crepis*
ncinata (James) T. & G., *Crepis*
ncinata (James) T. & G. subsp.
auca (Nutt.) Babcock & Stebbins,
chinacea angustifolia DC., *Erigeron*
per Nutt., *Erigeron caespitosus*
utt., *Gaillardia aristata* Pursh, *Grin-*
lia squarrosa (Pursh) Dunal var.
asiperennis Lunell, *Gutierrezia saro-*
rae (Pursh) Britt. & Rusby, *Haplo-*
ppus lanceolatus (Hook.) T. & G.,
aplopappus spinulosus (Pursh) DC.,
elianthus annuus L., *Helianthus*
etiflorus Pers. var. *subrhomboideus*
Rydb.) Fern., *Helianthus nuttallii* T.
G., *Hymenopappus filifolius* Hook.,
ymenoxys richardsonii (Hook.) Cock-
ell, *Iva axillaris* Pursh, *Iva xanthi-*
lia Nutt., *Lactuca pulchella* (Pursh)
C., *Lactuca scariola* L., *Liatris ligu-*
stylis (Nels.) K. Schum., *Liatris*
nctate Hook., *Lygodesmia juncea*
Pursh) D. Don., *Ratibida columni-*
ra (Nutt.) Woot. & Standl., *Senecio*
nus Hook., *Senecio integerrimus*
utt., *Solidago canadensis* L. var.
lvocanescens Rydb., *Solidago gigan-*
a Ait. var. serotina (Kuntze) Cronq.,
lidago missouriensis Nutt., *Solidago*
ollis Bartl., *Solidago rigida* L., *Son-*
us arvensis L., *Sonchus arvensis* L.
r. *glabrescens* Guenth., Grab.,
imm., *Sonchus asper* (L.) Hill,
anacetum vulgare L., *Taraxacum*
ythrospermum Andrz., *Taraxacum*
ficinale Weber, *Tragopogon dubius*
op., *Townsendia exscapa* (Rich-
ds.) Porter, *Xanthium strumarium*
.

mmary

This paper lists 336 species of vas-
lar plants in 61 different families
und in 1968 in the Big Muddy
gion. Some species were common
d abundant while others appeared
be rare but in this preliminary study no attempt was made to evaluate relative abundance. It is hoped that much more information about the plants of this interesting area will be obtained. Voucher specimens for this study have been placed in the University herbaria in both Saskatoon and Regina. The collection in Regina will be kept as a separate unit for several years so that interested botanists can examine species reported in this paper and so that additions to the flora of the area may be easily made.

Acknowledgments

I wish to express my appreciation to Dr. G. F. Ledingham of the University of Saskatchewan, Regina Campus, for the encouragement and guidance he gave me in carrying out this project and for his assistance in the field and laboratory. I gratefully acknowledge the aid of Mr. J. H. Hudson of the Saskatchewan Research Council Engineering Division, Saskatoon, who identified some of the collections and who verified all of the specimens collected. I wish, also, to thank Dr. G. W. Argus of the University of Saskatchewan, Saskatoon Campus, for his help in the identification of *Salix* species. To Mr. Richard Fyfe of Canadian Wildlife Service, Mr. Bernie Haysom, and those friends who assisted me in the field, I express my thanks. I especially thank Mr. and Mrs. W. Noble for their warm hospitality during my visits to the Big Muddy.

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Junior Naturalists

Edited by **Joyce Deutscher,** 7200 6th Ave., Regina

NATURE HOBBIES

by **Helene R. White,** Red Deer, Alberta

Once March arrives we all grow impatient for the first sign of spring. To many this means the opening of the flower buds on the willows.

This year let's rush spring a little bit and force a few pussy willows indoors. On a warm day, the temperature must be above 32 degrees for a few hours to allow the sap to run. Cut, don't break, a few small branches from each of several shrubs. To take an armful from one plant is sheer laziness and mutilates the tree. Remember, without our conservation of the beauty of our countryside i would soon be a bleak and uninvitin place.

Once your willows are cut and i doors, mash the stem ends to make easy for the cutting to take up th water you now place it in. Move th vase of willows down to the cool c your basement for about a week, the bring them up to the light. (Nankin cherry branches may be forced in th same way, incidentally.) Before yo know it you will have your silver pussy willows.

Should you wish them to remain i the open bud stage, take them out c the water and let them dry. We leav ours in water until the catkins form These little tails are the actua flowers of the willow.

Did you know that this deciduou plant is unisexual, meaning that ther are male plants and female plants Only in the magic season of spring this secret apparent. The male, as i so many of nature's species, is by fa the more noticeable of the two. H produces a showy amount of silve grey catkins and grows bright yello anthers on the slender delicat stamens of his flowers. The hungr bees head straight for this firs major pollen and nectar producer c spring.

The female is a mousy little catkin th inconspicuous green cleft pistils. it when you wander into a willow icket and a fragrant scent sur- inds you, look for her. This is her iy of attracting the bees so neces- ry for pollination.

Whether you force some willows to catkin stage in the house or efer to study them in the field, do t miss the opportunity of studying se interesting blossoms under a ignifying glass.

If your studies are done in the field u will likely spy a misty brown tterfly fluttering from catkin to tkin. If its beautiful wings are nded in yellow and orange with a sh of scarlet, chances are this little itor is the *Vanessa milberti*, a tillary of the tortoiseshell family. frequents the willows and poplars early spring. Insecticides have ken their toll of these butterflies, don't try to collect a specimen. ijoy its fleeting beauty and allow to go on its way.

A note pad and pencil should company you on each outing. Notes d rough sketches can be made for er checking and positive identifica- n of your finds. Date each sketch d note made for later reference. A ar from now you might want to ow just when those catkins and tterflies were observed, and where, you can plan another field trip.

ditors Note: *The Blue Jay* apolo- zes for the incorrect spelling in lene White's last article of the askasoo Creek.]

BARN SWALLOWS ARE PERSEVERING

y **Darwin Mazur**, age 14, Yellow Creek

Last summer a pair of Barn Swal- vs decided to make a nest in our cken coop. The female laid seven s. She incubated for five weeks. I ashed the eggs to discover that y were all rotten. A few days later started to lay some more eggs. is time she only laid five eggs. She ubated for two weeks. At the end two weeks the eggs hatched. There were five featherless young swallows. The young were in the nest for two weeks. After this they flew away.

I hope the parents will have better luck next year.

THE HURT MALLARD DUCK

by **Evelyn Lypchuk**, age 12, Yellow Creek

One day while I was milking cows I saw a Mallard duck hit a telephone wire. I quickly ran out to see the duck. The duck was hurt. I took the duck into the barn. I went to the house to get some bread and water to give to the duck. When I gave the duck the food she wouldn't eat it so I thought she would eat if I left. In the morning all the food was gone and she was ready to fly. I painted one of her feathers yellow and sent her off. Now I see she has made a nest. I see her almost every day.

NEST AND EGGS AT LAKE ISLE

by **David Hobson**, Edmonton, Alberta

On June 7, my friends and I went on a camping trip to Lake Isle, which is 50 miles west of Edmonton. We camped on Birch Island which was two miles from shore. Here I found quite a few nests. There were ten nests and seven eggs belonging to the Red-winged Blackbird. In one nest I found a cowbird's egg. There were three nests and five eggs of a Mallard. I also saw a Mallard and her young and two Red-necked Grebes.

The next day I came upon a woodchuck in the entrance of her burrow.

On the day we left I got a Red-winged Blackbird's nest which was an empty one for my collection.

MYSTERY BIRD

by **Ian Kinnan**, age 10, Melfort

Our family is trying to observe nature. Mom is very interested in flowers, and I have seen over 115 different birds this year. But we are really puzzled about a robin-sized bird with a long black tail and a white patch under the tail. It is gray with a white patch on the wing, a long slender bill with a white chin.

When it flies we see a white strip on either side of the tail.

We think this is a mockingbird but it is not found in our area. Its wing pattern is exactly the same as in the book. He sits on our fence and on the cut-leaved elder and eats the berries and appears to have a forked tail. I have seen him on September 19, and every day from October 7 to October 13. While I was writing I saw two. They looked young with ruffed out feathers. [**Editor's Note:** This is surely an authentic observation of a Mockingbird. They are rare in Saskatchewan, but they do appear from time to time in various localities.]

THE LITTLE LOST GOSLING

by **Rosemary Nemeth**, age 13, Yellow Creek

One evening when my mother was going to town she saw a little Canada Goose gosling. She caught it and brought it home. We thought it was about two weeks old. We didn't have any other tame ducks and geese. We could see the gosling was very lonely so my mother went and got some small tame geese and ducks. When the little gosling saw the small geese and ducks we could see she was very happy.

Later in the season she didn't look as nice because she was changing in colour. We didn't clip her wings and it was fun watching her fly.

This fall she looks like a graceful bird. But unfortunately we are going to butcher all the tame geese and ducks and the goose that was the little lost gosling.

THE BEAUTIFUL SQUIRREL

by **Debbie Shewchuk**, age 12, Yellow Creek

One day my dad and I went to pick hazelnuts. I was picking when all of a sudden I saw a squirrel. The squirrel was picking hazelnuts but when he saw us he ran up the tree.

The squirrel was brown and had a bushy tail. The squirrel looked so cute. That was the last I saw of him.

THE MUSKRAT

by **Josephine Kruppie**, age 12, Yellow Cre

One day I was coming from t
garden when all of a sudden I s
something run under the steps.
went to the steps and looked under.
saw something but I could not figu
out what it was. I ran in and told n
mom. I came out later and look
under. It was still there so I decid
I'd wait until it came out. I cou
tell it was a muskrat because I sa
its large front teeth. It came o
later and ran away.

THE LITTLE PIGS

by **Gordon Orenchuk**, age 12, Yellow Cre

One day the mother sow had litt
pigs. We went away from home a
came back. We forgot about the litt
pigs until night came. Before mo
and dad were gone to bed I popp
out of bed and told dad about t
pigs. He jumped out of the chair a
ran to see the little ones. It was ni
o'clock. He came back with three litt
pigs quite stiff. We warmed them
by the stove. By night the pigs we
all over the house squealing. No
they are all right in the pig pen.
hope they don't run into a m
puddle.

BIRD OBSERVATIONS

by **Lois Everett**, age 13, Strasbourg

We are always glad to see blu
birds. For a few years we saw on
one or two males. They appeared
go in the loft of the barn to nest b
we couldn't find where they neste
We live north and east of Strasbou
where it is hilly and bushy.

On a cold and windy day in Ap
mom and I saw eleven swallows whi
sat huddled up on the wires. Th
wouldn't fly away. They had whi
breasts.

CONTRIBUTORS TO THE JUNI NATURALISTS PAGE

Send your illustration, stories a
letters about nature to Mrs. Joy
Deutscher, 7200 6th Avenue, Regin
We will be looking forward to hea
ing from you.

The Blue Jay Bookshelf

ENNING HABITS OF THE POLAR EAR (Ursus maritimus Phipps). C. Richard Harington. 1968. Cana- an Wildlife Service report series, . 5. Queen's Printer, Ottawa. 50 nts.

This is not only a good factual port on denning, the result of idies in the Canadian Arctic by the thor between 1961 and 1964, but o a mine of further information in ard to polar bears; and finally, a nsible, objective, and moderate plea their preservation.

These interesting and romantic ani- ls have been known to man for a ig time, certainly for many years fore the Romans wrote of them in B.C. Many legends grew up in rthern Europe and Asia in regard their supposed ferocity, and prob- ly to Stone Age Man they did ap- ar pretty formidable. However, this oklet shows the animals in a rather ferent light.

Polar bears are the largest carni- res which are truly circumpolar in stribution, and for this alone they e unique. The brown bear of Russia d its counterpart in our own north *rsus arctos*) hardly occupy such an broken chain, besides which they e terrestrial, whereas the polar ar may be found far from land, en on occasion denning in pack ice. therefore follows that the govern- nts of not only Canada, but Green- nd, Norway, Russia and the State Alaska are all concerned with the lar bear's survival, and to this end, etings have been held between ese governments which are already lding fruit.

As early as 1939 Norway estab- hed a polar bear sanctuary on ng Karls Land near Spitzbergen; ile this report tells us that the viet Union now affords complete otection for her polar bears. We e also told that the world popula- n is about 10,000, of which 6,000 e in Canada, which puts us very much on the spot. In 1964 the world kill was 1,300 and the Canadian kill 600, so we appear to have taken a fairly modest quota. Actually, we do take polar bears on a quota system, and in the Northwest Territories only Indians and Eskimos (with a few exceptions) are permitted to hunt these animals.

Mr. Harington has presented a carefully planned and systematic account with maps, graphs, and some excellent explanatory drawings of densites. From these we learn that Banks Island, Simpson Peninsula and Southampton Island (all in the Northwest Territories) are among the most important denning and therefore cubbing areas for polar bears.

Mr. Harington mentions that most dens are to leeward of prevailing winds and tend to face south or southeast. In this respect they would seem to differ from what I know of black bears *(Ursus americanus)*, for both sexes of this species seem to prefer a den-mouth to face north or, especially in heavy bush, northeast. Within their range winter thaws commonly occur, in which case the drifted-in den-mouth might well become frozen and too hard to break through. It would seem that all bears on occasion take advantage of milder weather or the early spring strengthening of the sun to leave the den and sun themselves. In the case of polar bears then, they would have to go no farther than the "front porch."

There are fascinating notes on the movements of polar bears which are well worth following on the maps. It appears that many bears come south in fall on drift-ice. This bears out older writers, such as the master of the ship "Fox" when on the search for Franklin, as well as many others who met with bears far out to sea on floes and pack-ice. Certainly Mr. Harington mentions that at times polar bears have had no choice but to den in this maritime environment.

It would be a shame to quote to you any more from a book which is a gift at fifty cents and a six-cent stamp. But I must mention the excellent and beautiful photographs, which depict this great animal in such a way as to make us proud of harbouring their great number in our Northwest. The Department of Indian Affairs and Northern Development is to be congratulated on this publication.—*R. D. Symons*, Silton.

SAMSON'S LONG RIDE. By Kerry Wood. 1968. Collins, Don Mills, Ontario. $3.50.

Samson's Long Ride, by the famous Alberta naturalist, Kerry Wood, is a well-bound book, beautifully illustrated in black and white, and suitable for a gift for the ten-year-olds to the teens. It is a stimulating tale of the daring and courage of ten year-old Samson Beaver, son of Joby Beaver, "The Trail Maker", chief of the Stony Indian band.

Samson, left early in September at the Indian residential school established at Morley by the Rev. John McDougal, was outwardly docile but inwardly grieving for the freedom of the open trail. He managed to remain for a month, then quietly slipped away on the back of his pony, taking only one loaf of bread tucked in his shirt, determined to find his family.

Samson knew only that his family had headed north into the mountains and that his father's "Big Horse" had a split hoof. Expecting to overtake his family in a day or two, he was a whole month alone on the trail, suffering the pangs of hunger, cold and the danger from wild animals. His endurance and ingenuity delight the reader.

The first interest of this tale is that it is a true story. In addition, it has the power by its picturesque language of taking one right into those vast mountains and making one feel the biting winds and fear of wild animals. The black-and-white line drawings by Audrey Teather are powerful and authentic. Perhaps a map of the area would have added the authenticity, and a few footnot defining such words as "kinnikinick and "soapalallie" would increase t knowledge of the young natural for whom the book is intended.

One feels that this little tale cou be lengthened to a full biograph The postscript tantalizes us with glimpse of a very fine leader, and brave and noble gentleman, makin us feel that we would like to kno more of his life.—*Dorothy Rhod* Moose Jaw.

OF PREDATION AND LIFE. Paul L. Errington. 1967. Iowa Sta University Press, Ames, Iowa. $6. U.S.

Within his lifetime, the late E. Errington developed his intere in natural history and the outdoo into a major contribution to o understanding of the relationships b tween predators and their prey. Th his last book, summarizes some thir years of investigation into the inte action of predator and prey.

Dr. Errington devoted most of h research to the study of two pr species, the bobwhite quail and t muskrat, and their predators. In bo cases, predation is difficult to stu because several predator species a involved. The list includes sever kinds of raptors and mammalian ca nivores, differing greatly in behavio and the ease with which they can observed. Consequently, any dire measure of the numbers of prey kill by predators was impossible and i direct measures, such as the fr quency of prey remains in predat droppings and the abundance predators, had to be used. Despi these difficulties, it is impossible deny the importance of Dr. Errin ton's work. Few ecologists spend many years and so many field hou studying one ecological system as d Dr. Errington in the case of mi predation on muskrats.

The work summarized in this bo has formed the basis for much of t rrent research into predator-prey teractions. Dr. Errington's most portant contribution has been, in view, the discovery that some edators exist mainly on the surplus mbers of their prey and do not ually reduce prey numbers below ose levels that can be maintained by e food and cover of the environ- nt. He stresses the importance of od and cover in maintaining healthy ey populations. When these are ficient, predators can more easily l the weakened animals. Removal this surplus by the predators tually reduces competition among e remaining prey and increases the elihood of their survival. It remains be seen how widely this principle plies in the natural world but has rmed the basis of an enlightened edator in many places.

The author's approach to biology s essentially descriptive rather an experimental. Admittedly, ex- riments under natural conditions e difficult when large, freely-moving imals are involved, but the purely scriptive approach has certain limi- tions. Whenever any natural change the environment occurs (an excep- nally cold winter, for example), it difficult to record all resulting logical changes with accuracy. so, because such changes occur er large areas, usually no control pulation is available for compara- e study. One wonders if certain nipulative experiments, such as anging the population density of edator or prey or altering the ount of prey food or cover might t have provided convincing evidence rtaining to the regulation of prey mbers. As they stand, after thirty ars of descriptive work, Dr. Erring- n's conclusions about the import- ce of predators in controlling the mbers of their prey are still intui- e to some extent. Nevertheless, y provide a solid base for future perimentation.

In content, the book is informative d a valuable addition to the library anyone interested in predation. Unfortunately, only the first draft had been completed at the time of Dr. Errington's death. The book, edited posthumously, contains considerable repetition and lapses at time into scientific jargon. As a result, it is, in many places, too technical and tedious for a lay audience and not sufficiently precise for a scientific audience. The book contains no tables or graphs but a few simple bar or line graphs might have provided a clearer illustration of population fluctuation than description alone. A selection of good photographs to supplement the drawings would also have made the book attractive to a wider audience. These criticisms may seem petty in the light of the tremendous scientific contribution of Dr. Errington but it is just these things that will, in my opinion, prevent the book from becoming widely read. This is unfortunate because of the importance of the subject to natural history, ecology, and conservation and the wide experience of its author.

The book concludes with a plea for conservation of predators. Too many individuals and governments still espouse the goal of complete predator eradication when, in fact, predators are vital elements in maintaining some balance and stability in our increasing agrarian countryside. These same predators have the potential to prevent rodents and insects from reaching pest proportions. We should aim for reduction in predator numbers only when they interfere directly with man. — *Dr. D. H. Sheppard,* Regina.

NATURE'S WORLD

CBC-TV has a series of School Broadcasts every Monday from 10:00 to 10:30 a.m., March 1 to March 31. The third one (March 17) is about the Prairie Dogs at Val Marie where the Chandlers will host the Summer Meet this year. The fourth, on woodlands, was taken mostly in the Maurice G. Street Wildlife Sanctuary. The fifth, on the prairie, was made north of Swift Current and includes the sand dunes.

SASKATCHEWAN NEEDS ECOLOGICAL RESERVE

An invitation for co-operation

Canada is officially participating in the International Biological Progra The program has a number of facets, an important one exemplified by t study of production processes in grasslands at the Matador site in Saskatch wan. In Canada there are also research projects underway on fresh water a marine ecosystems as well as on human adaptability in the north.

All programs of research on land and its productivity require are where the uses can be controlled in the interests of long-term studies. A speci section of the IBP has therefore been set up, with the responsibility with each country for selecting natural areas worthy of preservation for purpos of research and education. The survival of representative tracts of Saska chewan's native landscape will not come about by happy chance; the only ho is an immediate program of ecological reserve establishment, encouraged a supported by responsible people. Rapid action is necessary because of t increasing mobility of populations and of man's increasing ability to drastical alter the earth's environments.

Natural areas are necessary for many reasons:

(1) to serve as outdoor laboratories of natural phenomena.
(2) to maintain large, heterogeneous, natural gene pools.
(3) to provide for research on natural ecosystems.
(4) as outdoor museums for education and public enjoyment.
(5) to develop intellectual and esthetic appreciation of nature.

As a first step, the Saskatchewan Committee of the IBP-CT (Conservati of Terrestrial Communities) would like to locate areas, within each geograph zone of the province, which are worthy of preservation because of their uniq natural features.

This is an open invitation to people interested in participating in t program. Information on areas worthy of preservation in the grassland zo parklands, forests and wetlands should be sent to one of the undersigne

J. S. Rowe
Department of Plant Ecology
University of Saskatchewan
Saskatoon, Sask.

G. F. Ledingham
Department of Biology
University of Saskatchew
Regina, Sask.

SNHS SUMMER MEET, 1969

Val Marie, Saskatchewan, June 13-15, 1969

The SNHS Summer Meeting will be held this year in southwestern Saskatchewan in the Frenchman River country, with headquarters at **Val Marie.** The feature attraction will be a visit to the SNHS Prairie Dog Sanctuary, and it is hoped that the cairn which is being erected in the sanctuary can be unveiled at that time.

Members will be interested to know that a film depicting the colony of Prairie Dogs protected in the SNHS sanctuary, "The Little Fellows", w be shown on CBC television at 10: a.m., March 17, 1969.

Hosts at the 1969 Summer M will be **David and Ruth Chandler.**

In addition to accommodation Val Marie and adjacent towns, the will be a camp ground near t Prairie Dog sanctuary for those w wish to bring their tents. Furth information about the meet will a pear in the NEWSLETTER.

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